A STUDY OF INCIDENCE OF INCIDENTAL GALL BLADDER IN SIMPLE CHOLECYSTECTOMY SPECIMEN BY HISTOPATHOLOGY, MANAGEMENT AND FOLLOW-UP

A DISSERTATION SUBMITTED TO

THE TAMILNADU DR.M.G.R MEDICALUNIVERSITY

In partial fulfillment of the regulations for the award of the

M.S.DEGREE EXAMINATION

BRANCH I GENERAL SURGERY

DEPARTMENT OF GENERAL SURGERY
STANLEY MEDICAL COLLEGE AND HOSPITAL

THE TAMILNADU DR.M.G.R MEDICAL UNIVERSITY
CHENNAI

APRIL 2015

CERTIFICATE

This is to certify that the dissertation titled **"*A STUDY ON INCIDENCE OF INCIDENTAL GALLBLADDER CARCINOMA IN SIMPLE CHOLECYSTECTOMY SPECIMEN BY HISTOPATHOLOGY, MANAGEMENT AND FOLLOW-UP*"** is the bonafide work done by ***Dr.E.PREM KUMAR*,** Post Graduate student (2012 – 2015) inthe Department of General Surgery, Government Stanley Medical College and Hospital, Chennai under my direct guidance andsupervision, in partial fulfillment of the regulations of The TamilNadu Dr. M.G.R Medical University, Chennai for the award of M.S., Degree (General Surgery) Branch - I, Examination to be heldin April 2015.

Prof.DR.C.BALAMURUGAN,M.S.,
Professor of Surgery,
Dept. of General Surgery,
Stanley Medical College
Chennai-600001.

Prof.DR.S.VISWANATHAN,M.S.,
Professor and Head of the Department,
Dept. of General Surgery,
Stanley Medical College,
Chennai-600001.

PROF. DR.AL.MEENAKSHISUNDARAM, M.D., D.A.,
The Dean,
Stanley Medical College,
Chennai-600001.

DECLARATION

I, **DR.E.PREM KUMAR** solemnly declare that this dissertation titled ***"A STUDY ON INCIDENCE OF INCIDENTAL GALLBLADDER CARCINOMA IN SIMPLE CHOLECYSTECTOMY SPECIMEN BY HISTOPATHOLOGY, MANAGEMENT AND FOLLOW-UP"*** is the is a bonafide work done by me in the Department of General Surgery, Government Stanley Medical College and Hospital, Chennaiunder the guidance and supervision of my unit chief.

Prof. DR.C.BALAMURUGAN

Professor of Surgery

This dissertation is submitted to The TamilnaduDr.M.G.R.Medical University, Chennai in partial fulfillment of the university regulations for the award of M.S., Degree (General Surgery) Branch - I, Examination to be held in April 2015

Place: Chennai.

Date: September 2014 **DR. E. PREM KUMAR**

ACKNOWLEDGEMENT

My sincere thanks to **Dr.AL.MEENAKSHISUNDARAM, MD., D.A.,** The Dean, Govt. Stanley Medical College for permitting me to conduct the study and use the resources of the College. I consider it a privilege to have done this study under the supervision of my beloved Professor and Head of the Department **Prof.Dr.S.VISWANATHAN,** who has been a source of constant inspiration and encouragement to accomplish this work.

I am highly indebted to my guide and Mentor **Prof. Dr.C.BALAMURUGAN,** Professor of Surgery for his constant help, inspiration and valuable advice in preparing this dissertation. I express my deepest sense of thankfulness to my Assistant Professors **Dr.G.Venkatesh, Dr.M.Vignesh, Dr.Ramprakash** for their valuable inputs and constant encouragement without which this dissertation could not have been completed.I express my sincere gratitude to my guides **Prof.Dr.P.Darwin, Prof.Dr.J.Vijayan, Prof.Dr.K.Kamaraj**, former Heads of Department of General Surgery. I thank them for the constant support, guidance, inspiring words and valuable help they rendered to me during my course.

I am particularly thankful to my friends Dr.Aravind, Dr.Varun Gandhi, Dr.Ashok, Dr.sabarimalai, Dr.Kitakawotsa, Dr.sivasankar,

Dr.Srinivasan, Dr.Paranthaman without whom accomplishing this task would have been impossible. I thank my Seniors Dr. VigneshSayee, Dr.Anand, Dr.Jessima, Dr.Darwin Britto, Dr.N.Prakash, Dr.Shivansu Misra and for their valuable support in this study.

I am extremely thankful to my patients who consented and participated to make this study possible.

LIST OF ABBREVIATIONS

LC → Laparoscopic Cholecystectomy

OC → Open Cholecystectomy

MCL → Mid Clavicular Line

M : F → Male : Female

RUQ → Right Upper Quadrant

CCK → Cholecystokinin

CT → Computed Tomography

US → Ultra Sound

MRCP → Magnetic Resonance Cholangio Pancreatography

PTC → Percutaneous Transhepatic Cholangiography

GB → Gall Bladder

CBD → Common Bile Duct

CO2 → Carbon Dioxide

S.D → Standard Deviation

CHC → Chronic Cholecystitis

CCC → Chronic Calculous Cholecystitis

CONTENTS

S.NO	CHAPTER	PAGE NO
1	INTRODUCTION	1
2	AIMS AND OBJECTIVES	2
3	HISTORICAL ASPECTS	3
4	MATERIALS AND METHODS	8
5	REVIEW OF LITERATURE	9
6	OBSERVATIONS AND RESULTS	81
7	DISCUSSIONS	94
8	CONCLUSIONS	100
9	BIBLIOGRAPHY	101
	ANNEXURE (i) PROFORMA (ii) INSTITUTIONAL ETHICAL COMMITTEE APPROVAL CERTIFICATE (iii) MASTER CHART (iv) CONSENT FORM	 104 106 107

INTRODUCTION

INTRODUCTION

Cholecystectomy is the most common major abdominal procedure performed worldwide. Carcinoma of gallbladder is the 5th most common cancer of digestive tract and the most common malignancy of the biliary tract.The clinical manifestations of gall bladder carcinoma are generally indistinguishable from those associated with cholecystitis or cholelithiasis. Around 90% of GB (Gall bladder) carcinoma have accompanying stone.Stones and chronic inflammation are the risk factors for carcinoma of gallbladder.

Most of the cases of GB carcinoma are diagnosed during or after surgery performed for stones or benign biliary diseases. Despite advancements in various diagnostic procedures, preoperative diagnosis of early GB carcinoma is very difficult to diagnose. Advanced stage of the disease because of delayed diagnosis leads to its poor prognosis.

AIMS AND OBJECTIVES

AIMS AND OBJECTIVES

The purpose of the present study is to find the INCIDENCE OF INCIDENTAL GALL BLADDER CARCINOMA IN SIMPLE CHOLECYSTECTOMY SPECIMEN BY HISTOPATHOLOGY, MANAGEMENT AND FOLLOW-UP

study design: prospective observational study

materials:100 patients

study & follow-up period : 1 year

Inclusion criteria: All patients with undergoing simple cholecystectomy for gall stone and benign biliary disease.

Exclusioncriteria: Patients with pre diagnosed Gallbladder malignancy, Gallbladder mass, Empyema Gallbladder and Gallstones associated with obstructive jaundice were excluded

HISTORICAL ASPECTS

HISTORICAL ASPECTS

Anatomic and Surgical History of the Extrahepatic Biliary Tract and Gallbladder

Aristotle (384-322 B.C.)		Mentioned absence of gallbladder in animals
Galen (ca. A.D. 130-200)		Stated that humans have a single bile duct, or perhaps paired bile ducts
Berengario da Carpi	1522	Agreed with Galen. Wrote, "Sometimes a man lacks a gallbladder; he is then of infirm health and a shorter life."
De Laguna	1535	Agreed with Galen
Vesalius	1543	Did not accept concept of Galen
Fallopius	1606	Denied concept of Galen
Bergman	1701	First definite case of absence of human gallbladder
Vater	1723	First report of dilatation of common bile duct
Morgagni	1769	Reported deformations of the gallbladder; may have been first to see torsion of the gallbladder
Home	1813	Described biliary atresia
Bobbs	1867	Described hydrops of gallbladder and performed first successful removal of gallstones

Von Wyss	1870	Studied variations of the common bile duct
Nitze	1877	Introduction of cystoscope
Calot	1891	Original description of cholecystohepatic triangle (Triangle of Calot)
Swain	1894	Performed first successful operation for cystic dilatation of the bile duct, a cholecystojejunostomy
Eppinger	1902	Studied cholestasis
Dévé	1903	First description of gallbladder completely submerged in the liver substance (intrahepatic gallbladder)
Yllpö	1913	Reported extrahepatic biliary atresia due to embryonic developmental arrest
Reich	1918	Produced first roentgenography of biliary tree by injecting bismuth paste and petrolatum into an external fistula
Beall and Jagoda	1921	Obtained incidental opacification of the biliary tract during upper GI series performed with barium and buttermilk
Bakes	1923	First report of intraoperative endoscopic visualization of the bile ducts; used ampullary dilators which are now known as Bakes' dilators
Neugebauer	1924	First preoperative diagnosis of cystic dilatation of the common bile duct

Boyden	1926	Studied duplication of the gallbladder
Ladd	1928	First successful repair of biliary atresia
Ginzburg and Benjamin; Gabriel	1930	Simultaneous studies of biliary tract with Lipiodol injections
Mirizzi	1931	First operative cholangiography
Boyden	1932	Reviewed reports from 1800-1932 of bile ducts entering the stomach
Hicken, Best, and Hunt	1936	Performed operative cholangiography through the cystic duct stump
Babcock	1937	Used cystoscope to visualize interior of gallbladder
McIver	1941	Visualization of bile duct, showing stone
Porcher and Caroli	1948	Designed device for operative cholangiography
Mirizzi	1948	Reported syndrome of a long cystic duct with impacted stone (Mirizzi's syndrome)
Ahrens	1951	First description of intrahepatic biliary atresia
Mallet-Guy	1952	Attempted to establish operative cholangiography as a routine procedure
Wildegans	1953	Instrumental in development of observation choledochoscope and operating-observation choledochoscope
Healey and	1953	Studied intrahepatic anatomy of bile ducts

Schroy		
Boyden	1957	Described relationship of sphincter of Oddi to common bile duct
Kasai	1957	Described treatment of "noncorrectable" cases of biliary atresia by hepatic portoenterostomy. Report published in Japanese in 1957, in English in 1968.
Alonso-Lej et al.	1959	Presented first classification system for choledochal cysts (described 3 types)
Myers et al.	1962	Cinefluorographic observation of the common bile duct
Kune	1964	Described surgical anatomy of common bile duct
Klatskin	1965	Described adenocarcinoma at hepatic duct bifurcation (Klatskin tumors) [Altemeier had described same structures in 1957]
Hering	1972	Described the connecting link between bile canaliculi and ductules
Todani et al.	1977	Developed current standard classification of cystic dilatation of the common bile duct
Harlaftis et al.	1977	Reviewed the literature of gallbladder duplication
Northover and Terblanche	1978	First description of retroportal artery
Frimdberg	1978	Performed laparoscopic cholecystotomy in pigs

Toouli et al.	1982 to 1986	Studied normal and abnormal function of sphincter of Oddi
Filipi, Mall, and Reosma	1985	Performed first animal laparoscopic cholecystectomy
Mühe	1985	Successfully treated patients by laparoscopic cholecystectomy
Mouret	1987	Generally credited with first human laparoscopic cholecystectomy
Petelim	1991	Performed laparoscopic choledochocholithotomy
Cotton et al.	1991	Studied risks and benefits of endoscopic sphincterotomy for bile stones in elderly high-risk patients and healthy young patients with normal-sized ducts
	1994	
	1995	
O'Neill	1992	Wrote classic monograph on choledochal cysts
Hintze et al.	1997	Successfully treated post-gastrojejunostomy patients endoscopically for biliary disease

MATERIALS AND METHODS

MATERIALS AND METHODS

Patient presenting with right hypochondrial pain, jaundice, dyspepsia will be taken detailed history, clinical examination and necessary investigations including blood complete picture, liver function tests and ultrasound abdomen.

Patients who are diagnosed as having gall stones and other benign biliary disease who require simple cholecystectomy are subjected to open/laparoscopic cholecystectomy and the gallbladder specimens will be sent for histopathological study.

Patients with positive histology for carcinoma will be called up and managed depending upon the stage of disease and followed up for one year. Data will be collected and analyzed through SPSS version 16.

REVIEW OF LITERATURE

REVIEW OF LITERATURE

EPIDEMIOLOGY

The prevalence of gallbladder cancer appears to be highest in South America, intermediate in Europe, and lower in the United States and the United Kingdom. The prevalence of gallbladder stone varies widely in different parts of the world. In India it is estimated to be around 4%. An epidemiological study restricted to showed that North Indians have 7 times higher occurrence of gall stone as compared with South Indians. Changing incidence in India is mainly attributed to westernization and availability of investigation such as ultrasound in urban as well as rural areas and also because of increasing affordability

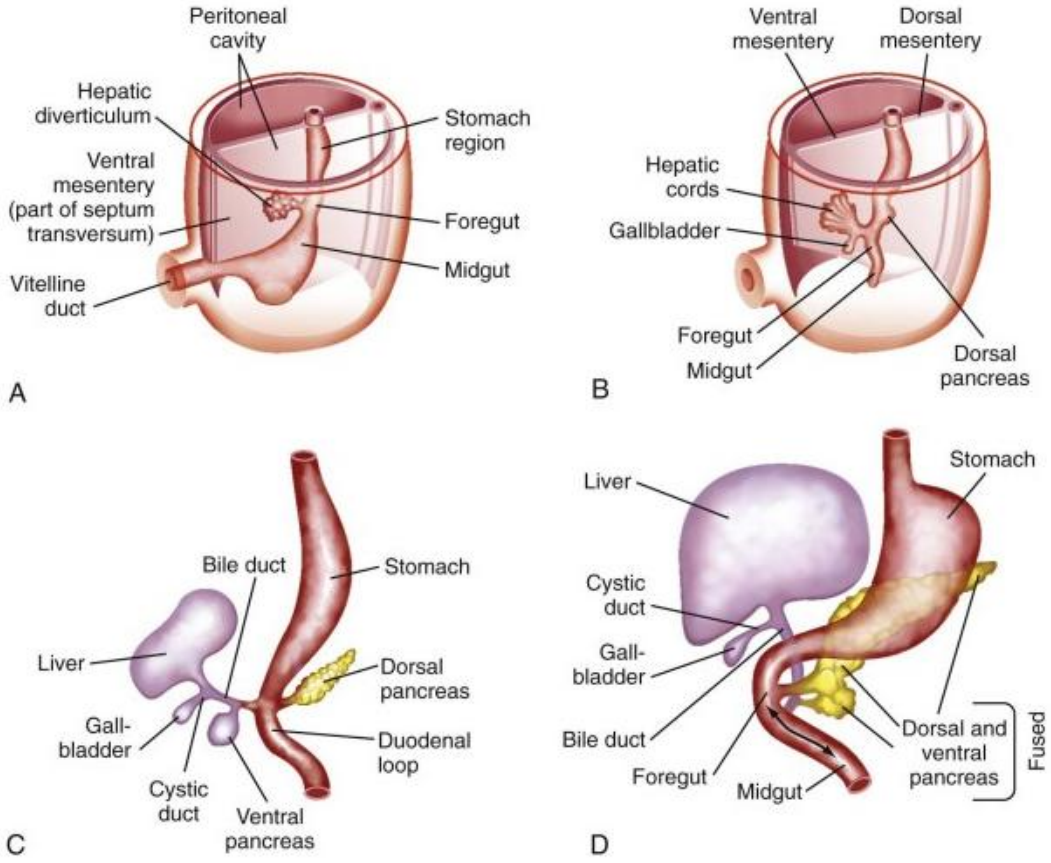
In the United States, Native Americans, patients in urban areas, and those of lower socioeconomic status appear to be affected more commonly. Epidemiologic analysis of this disease identifies those processes promoting chronic gallbladder irritation and inflammation as risk factors for the onset of gallbladder cancer. As such, a history of biliary disease, age, female gender, obesity, high carbohydrate diet, ethanol abuse, and tobacco abuse (all of which are associated with calculous biliary disease) have been shown to be associated with a higher risk of developing gallbladder cancer. Indeed, 79% to 98% of patients diagnosed with gallbladder cancer possess a personal history of

gallstone disease (usually large, symptomatic, cholesterol stones). Mirizzi's syndrome, characterized by chronic gallbladder irritation from an impacted stone, has been associated with an increased risk of gallbladder cancer. The presence of an abnormal pancreaticobiliary duct junction, thought to promote chronic biliary inflammation has been associated with both choledochal cyst disease as well as gallbladder cancer. The incidence of gallbladder cancer in the so-called porcelain gallbladder presumably resulting from chronic inflammation and calcification of the gallbladder wall has been estimated to be as high as 61%; however, recent analysis suggest that the figure is more likely between 7% and 25%.

The exact nature of the relationship between chronic inflammation and gallbladder tumorigenesis is unclear. It has been estimated that only 0.3% to 3% of patients with gallstones develop gallbladder cancer.

EMBRYOLOGY

Liver arises in the fourth week as a diverticulum from the ventral surface of the duodenal foregut, close to its junction with the midgut where the later is continuous with the yolk stalk this diverticulum, lined with endoderm, grows vertically and cranially into the septum transversum, its tip diverges into two solid hepatic buds of cells, the further right and left lobes of liver, the buds develops into epithelial trabeculae or sheet (so called hepatic cylinders), which branch and anastamose to form a closed meshwork. The interval of meshwork become filled with blood sinusoids and on section the organ has the appearance of vascular sponge, The original diverticulum from the duodenum forms the bile duct and from its distal part the cystic duct and gall bladder arise as an outgrowth, solid at first but later canalized



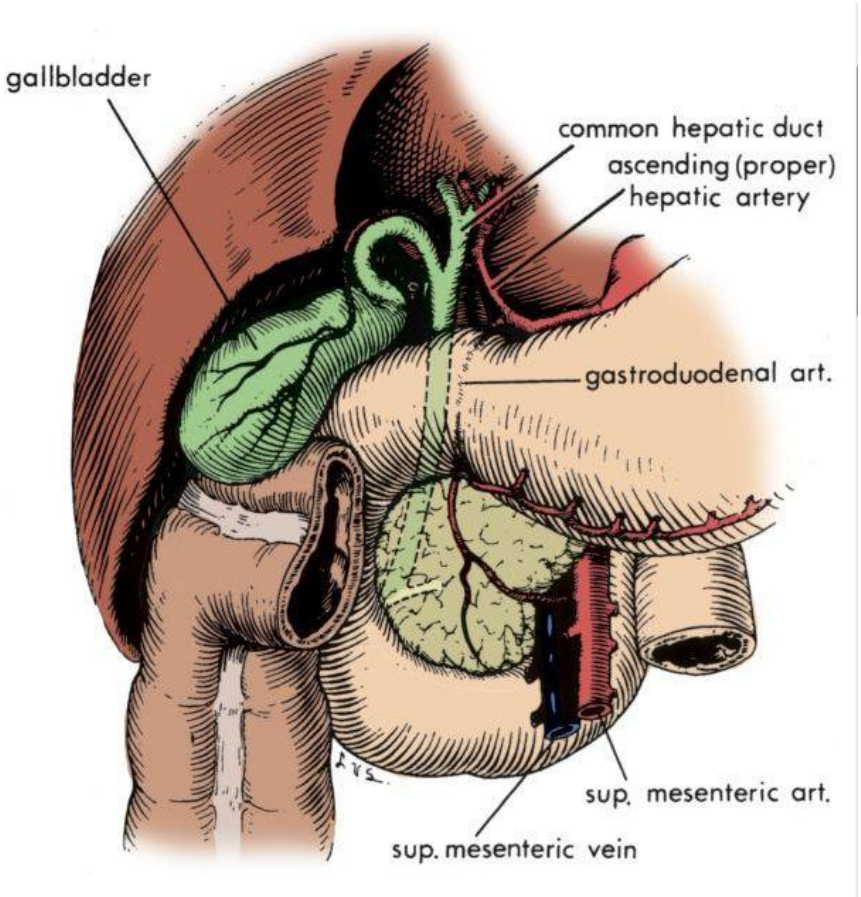
ANATOMY

Gallbladder and Cystic Duct

The gallbladder is a pear-shaped organ that lies on the inferior surface of the liver at the junction of the left and right hepatic lobes between Couinaud's segments IV and V. The gallbladder varies from 7 to 10 cm in length and from 2.5 to 3.5 cm in width. The gallbladder's volume varies considerably, being large during fasting states and small after eating. A moderately distended gallbladder has a capacity of 50 to 60 ml of bile but may become much larger with certain pathologic

states. The gallbladder has been divided into four areas: the fundus, body, infundibulum, and neck. Hartmann's pouch is an asymmetrical bulge of the infundibulum that lies close to the gallbladder's neck. The neck points in a cephalad and dorsal direction to join the cystic duct.

Anatomic relationships of the gallbladder.



The gallbladder wall consists of five layers. The innermost layer is the epithelium, and the other layers are the lamina propria, smooth muscle, perimuscular subserosal connective tissue, and serosa. The gallbladder has no muscularis mucosa or submucosa. Most cells in the mucosa are columnar cells, and their main function is absorption. These cells are aligned in a single row, with slightly eosinophilic cytoplasm, apical vacuoles, and basal or central nuclei.

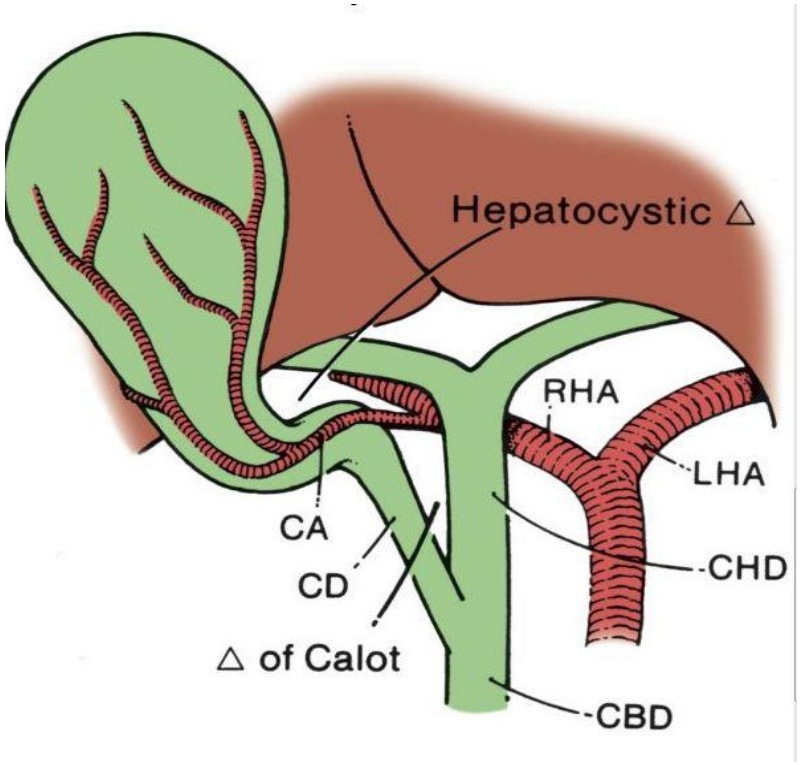
The lamina propria contains nerve fibers, vessels, lymphatics, elastic fibers, loose connective tissue, and occasional mast cells and macrophages. The muscle layer is a loose arrangement of circular, longitudinal, and oblique fibers without well-developed layers. Ganglia are found between smooth muscle bundles. The subserosa is composed of a loose arrangement of fibroblasts, elastic and collagen fibers, vessels, nerves, lymphatics, and adipocytes.

Rokitansky-Aschoff sinuses are invaginations of epithelium into the lamina propria, muscle, and subserosal connective tissue. These sinuses are present in about 40% of normal gallbladders and are present in abundance in almost all inflamed gallbladders. The ducts of Luschka are tiny bile ducts found around the muscle layer on the hepatic side of

the gallbladder. They are found in about 10% of normal gallbladders and have no relation to the Rokitansky-Aschoff sinuses or to cholecystitis.

The cystic duct arises from the gallbladder and joins the common hepatic duct to form the common bile duct. The length of the cystic duct is variable, averaging between 2 and 4 cm. The cystic duct usually courses downward in the hepatoduodenal ligament to join the lateral aspect of the supraduodenal portion of the common hepatic duct at an acute angle. Occasionally, the cystic duct may join the right hepatic duct, or it may extend downward to join the retroduodenal duct. In addition, the cystic duct may join the common hepatic duct at a right angle, may run parallel to the common hepatic duct, or may enter the common hepatic duct dorsally, on its left side, behind the duodenum, or, rarely, may enter the duodenum directly. The cystic duct contains a variable number of mucosal folds, similar to those found in the neck of the gallbladder. Although referred to as valves of Heister, these spiral folds do not have a valvular function. Variations in the length and course of the cystic duct and its point of union with the common hepatic duct are common.

In 1891, Calot described a triangular anatomic region formed by the common hepatic duct medially, the cystic duct laterally, and the cystic artery superiorly. Calot's triangle is considered by most to comprise the triangular area with an upper boundary formed by the inferior margin of the right lobe of the liver, rather than the cystic artery. A thorough appreciation of the anatomy of Calot's triangle is essential during performance of a cholecystectomy because numerous important structures pass through this area. In most instances, the cystic artery arises as a branch of the right hepatic artery within the hepatocystic triangle. A replaced or aberrant right hepatic artery arising from the superior mesenteric artery usually courses through the medial aspect of the triangle, posterior to the cystic duct. Aberrant or accessory hepatic ducts also may pass through Calot's triangle before joining the cystic duct or common hepatic duct. During performance of a cholecystectomy, clear visualization of the hepatocystic triangle essential with accurate identification of all structures within this triangle.



The triangle (Δ) of Calot and the hepatocystic triangle. The two triangles differ in their upper boundaries. The upper boundary of Calot's triangle is the cystic artery (CA), whereas that of the hepatocystic triangle is the inferior margin of the liver. CBD, common bile duct; CD, cystic duct; CHD, common hepatic duct; LHA, left hepatic artery; RHA, right hepatic artery.

Gallbladder

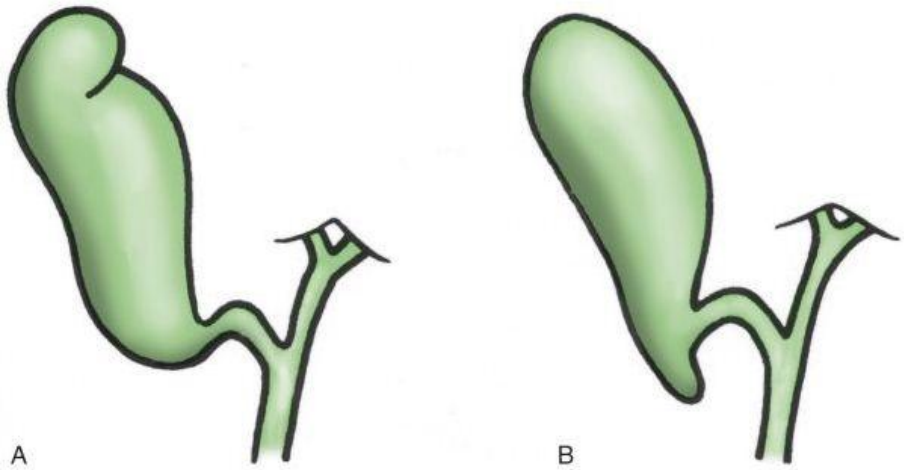
Some apparent anomalies are acquired, but most result from arrested or abnormal development at some stage of embryonic growth. These anomalies vary in their clinical significance: Some are only

medical curiosities and require no attempt at correction, whereas others require surgical intervention. The gallbladder anomalies may be divided into three groups based on formation, number, and position.

Anomalies of the Gallbladder
Formation
Phrygian cap
Bilobed gallbladder
Hourglass gallbladder
Diverticulum of the gallbladder
Rudimentary gallbladder
Number
Absence of the gallbladder (agenesis)
Duplication of the gallbladder
Position
Floating gallbladder
Intrahepatic gallbladder
Left-sided gallbladder
Transverse gallbladder
Retrodisplaced gallbladder

Phrygian Cap

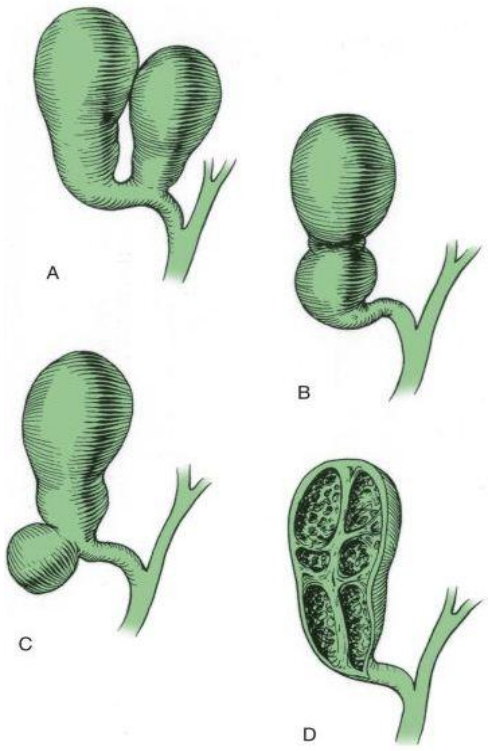
This anomaly of formation is the most common of the gallbladder. Phrygian cap occurs in individuals of all ages and more commonly in women. Boyden found that this anomaly was present as confirmed by oral cholecystography in 18% of patients with a functioning gallbladder. The phrygian cap deformity is created by an infolding of a septum between the body and the fundus. The gallbladder functions normally, and this anomaly is not an indication for cholecystectomy.



Deformations of the gallbladder. A, Phrygian cap deformity. B, Hartmann's pouch of the infundibulum.

Bilobed Gallbladder

This rare anomaly of formation consists of a completely divided gallbladder drained by a common cystic duct. Bilobed gallbladder occurs in two forms: (1) a type that has the outward appearance of a single gallbladder but is divided internally by a longitudinal fibrous septum; and (2) a type that has the outward appearance of two separate gallbladders that are fused at the neck. A bilobed gallbladder has no clinical significance and does not require excision unless it becomes symptomatic.



Anomalies of the gallbladder. **A,**Bilobed gallbladder. **B,** Hourglass gallbladder. **C,** Congenital diverticulum of the infundibulum. **D,** Septate gallbladder

Hourglass Gallbladder

Alterations in the contour of the gallbladder may result in a dumbbell or hourglass form. These anomalies are not rare and can be congenital or acquired. In children, this anomaly is congenital and does not require removal. In adults, this abnormality usually results from chronic cholecystitis and should be removed.

Diverticulum of the Gallbladder

Congenital diverticula of the gallbladder are rare, being found in only 25 of 29,701 gallbladders removed surgically at the Mayo Clinic. Diverticula may occur in any part of the gallbladder and may vary greatly in size from 0.5 to 9 cm in diameter. These diverticula are clinically insignificant unless they become the site of disease, in which case they may contain stones, become acutely inflamed, or even perforate. Hartmann's pouch is an acquired diverticulum of the infundibulum or neck of the gallbladder. This pouch projects from the convexity of the gallbladder neck and may be closely adherent to the common bile duct. Hartmann's pouch is associated with pathologic conditions of the gallbladder, especially those involving prolonged obstruction to gallbladder emptying.

Rudimentary Gallbladder

This condition consists of a small nubbin at the end of the cystic duct. When found in infants and children, a rudimentary gallbladder is believed to be due to congenital hypoplasia and usually requires no treatment. In an elderly person, this situation may be the result of fibrosis from cholecystitis and may require removal.

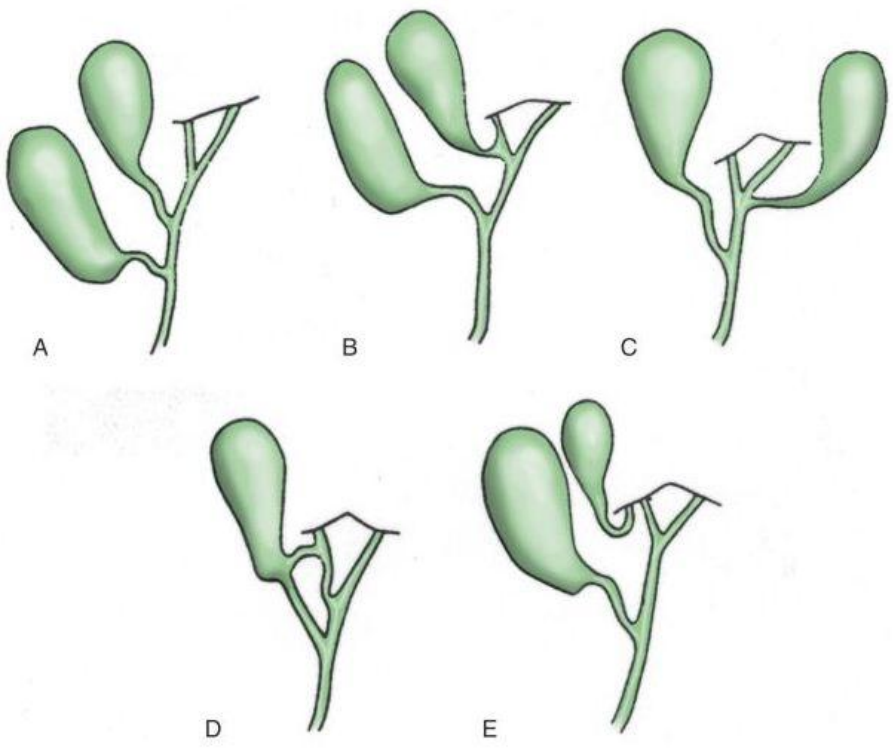
Absence of the Gallbladder (Agenesis)

More than 200 cases of absence of the gallbladder have been reported. Most cases are associated with other biliary abnormalities, and most of the patients die before 6 months of age. One publication reviewed 185 cases of gallbladder agenesis. In this series, 70 (38%) were completely absent, 60 (32%) were rudimentary, and 55 (30%) were a fibrous structure.

Duplication

This anomaly occurs in approximately 1 in 4000 persons. A true duplicated gallbladder has two separate cavities, each drained by its own cystic duct and sometimes supplied by its own cystic artery. Duplication occurs as one of two varieties: (1) the more common ductular type, in which each gallbladder has its own cystic duct that empties

independently into the same or different parts of the extrahepatic biliary tree; and (2) a type in which the two ducts gradually merge into a common cystic duct before emptying into the common bile duct. The gallbladder itself may be seen as two distinct organs at variable distances apart or may outwardly have the appearance of a single organ. Each cavity may function normally or become diseased independently of the other. Duplication of the gallbladder is clinically unimportant and generally requires no treatment.



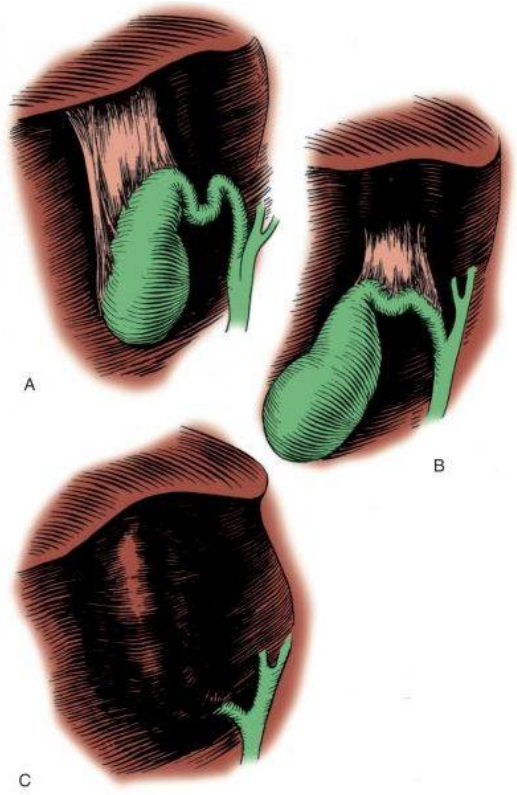
A to **E,** Duplication of the gallbladder.

Rarely, a gallbladder may be found in an abnormal location. This type of gallbladder requires no treatment unless it causes symptoms. Five different conditions are recognized: floating, intrahepatic, left-sided, transverse, and retrodisplaced.

Floating Gallbladder

A floating gallbladder has been reported to occur in approximately 5% of persons. In this condition, the gallbladder is completely surrounded by peritoneum and is attached to the undersurface of the cystic fossa by the peritoneal reflection from the liver. This attachment may extend the entire length of the gallbladder, or it may include only the cystic duct, thus leaving the gallbladder unsupported and ptosed. This condition usually occurs in women older than 60 years of age. Such a gallbladder not only is subject to the same pathologic changes as a normally placed gallbladder but also may undergo torsion around its pedicle. Torsion of the gallbladder usually occurs in persons 60 to 80 years of age, but it has also been reported to occur in young children. When torsion of the gallbladder occurs, an abrupt onset of symptoms may include acute right upper quadrant abdominal pain, nausea, and vomiting. Torsion of the gallbladder

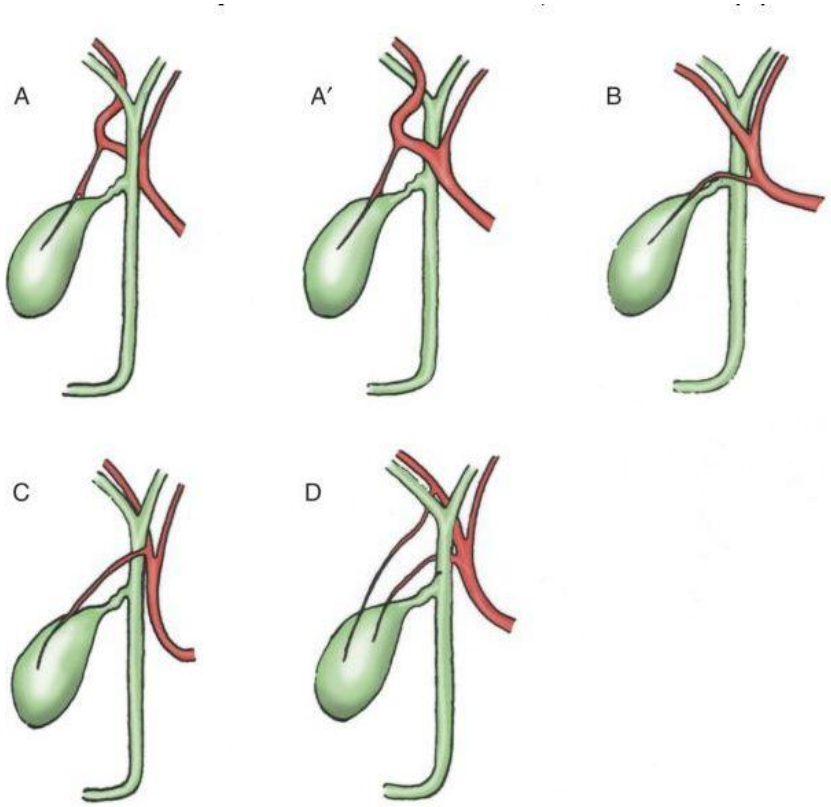
requires operative detorsion and removal of the gallbladder, which may be infarcted as a result of occlusion of its blood vessels.



Anomalies of gallbladder position. **A,** Floating gallbladder with mesentery. **B,** Cystic duct with mesentery. **C,** Intrahepatic gallbladder.

Variations in the arterial supply of the extrahepatic biliary tree are more common than variations in the ductal anatomy. Anatomic variations of the hepatic and cystic arteries are present in approximately 50% of individuals. Based on their anatomic dissections, Benson and Page described three surgically important variations in the arterial anatomy. An accessory or double cystic artery occurs in approximately

15% to 20% of individuals. These arteries usually arise from the right hepatic artery within Calot's triangle. Triple cystic arteries are unusual and occur in less than 1% of individuals. During dissection of Calot's triangle, care should be taken to exclude the presence of an accessory cystic artery.



Vascular anomalies. **A,** A', "Caterpillar hump" right hepatic artery. **B,** Right hepatic artery anterior to common hepatic (or common bile) duct. **C,** Cystic artery anterior to common hepatic (or common bile) duct. **D,** Accessory cystic artery.

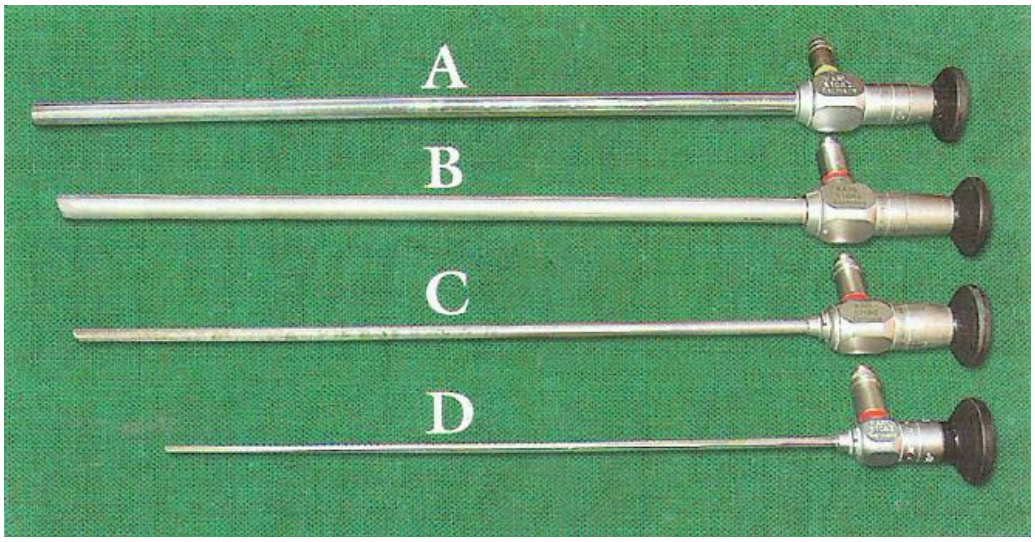
In 5% to 15% of individuals, the right hepatic artery courses through Calot's triangle in close proximity to the cystic duct before turning upward to enter the hilum of the liver. In this location, the cystic artery arises from the convex aspect of the angled or humped portion of the hepatic artery. This “caterpillar hump” right hepatic artery may easily be mistaken for the cystic artery and may be inadvertently ligated during performance of a cholecystectomy. The cystic artery that arises from the caterpillar hump is typically short and may easily be avulsed from the hepatic artery if excessive traction is applied to the gallbladder.

The cystic artery may occasionally pass anterior to the common bile duct or common hepatic duct. In this location, the cystic artery, rather than the cystic duct, is usually the first structure encountered during dissection of the lower border of Calot's triangle. These arteries usually require ligation and division early in the dissection during a cholecystectomy, to provide adequate exposure of the cystic duct.

LAPAROSCOPIC CHOLECYCTECTOMY

Equipment and Instrumentation:

Laparoscopes:



Modern laparoscopes come in a variety of sizes and configurations. The most commonly used laparoscopes are rigid instruments that employ the Hopkins rod lens system of optics. The basic components of the rod lens system include a series of quartz rod lenses and image reversal system, optical fibers for the transmission of light, an objective lens, and an eyepiece. These features allow enhanced light transmission and image resolution, as well as superior color reproduction. Rigid laparoscopes come in sizes ranging from 3 to 10 mm diameter and a variety of viewing angles. The 00 or end/forward viewing laparoscope is the easiest to use, and its use results in the least

amount of image distortion, as well as the brightest image. Angled (300, 450) scopes provide greater versatility by allowing the operator to look around corners and over the surfaces of solid structures (e.g. the liver). Recently, flexible laparoscopes have been developed that use fibreoptic bundles for visualization and that provide even greater flexibility in the viewing angle.

Video Imaging Systems

The basic components required for video laparoscopy include the laparoscope, a light source, a video camera, a camera control unit, and a video monitor. A high intensity light source (usually xenon) is necessary to provide adequate illumination of the peritoneal cavity. The light

source is connected to the laparoscope by either fibreoptic cable or a fluid side of the operating table, are commonly used for most laparoscopic cases, allowing all members of the surgical team an unobstructed view of the operation.

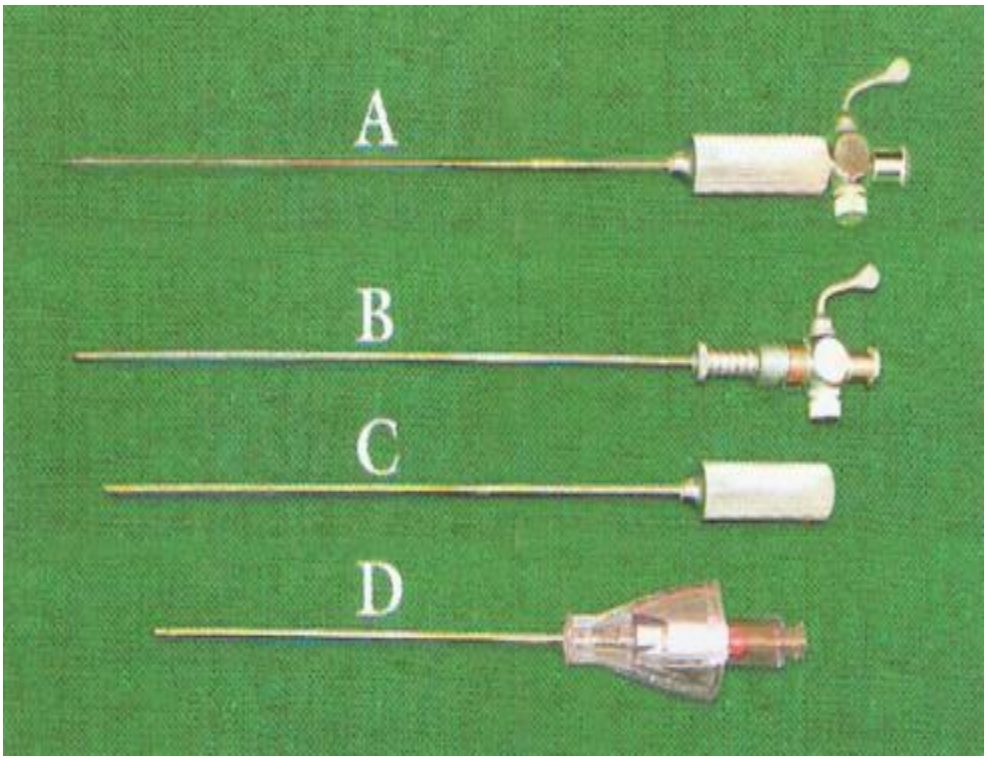
Optic fibre cable

Insufflators:

The creation of a working space for laparoscopic surgery within the abdominal cavity generally is accomplished using CO2 delivered to the patient via an automatic, high-flow, pressure-regulated insufflators.

Carbon dioxide is used because of the low risk of gas embolism, lack of toxicity to peritoneal tissues, rapid rate of reabsorption, low cost and ease of use. It also suppresses combustion, making it safe for use with the electrocautery or laser. Ideally, the insufflator should be able to deliver CO2 at a flow rate of up to 8 to 10 L/min with a minimum acceptable flow rate of 6 L/min. In addition to regulating gas flow, the insufflator monitors intra-abdominal pressure and stops delivery of CO2 whenever the pressure exceeds a predetermined level. This pressure limit usually is set at 12 to 15 mm Hg because of the risk of hypercarbia, acidosis, and adverse haemodynamic and pulmonary effects at higher pressure.

Trocars and Insufflation needles:

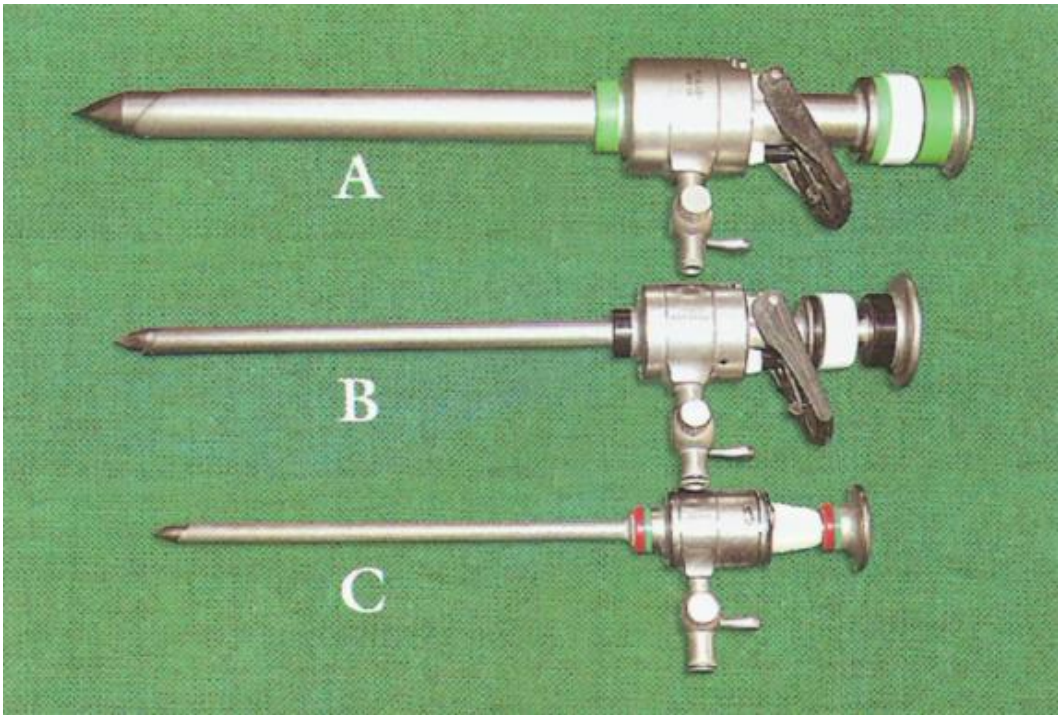


Two types of instruments are used to gain access to the peritoneal cavity for laparoscopic surgery: the Veress needle and the laparoscopic trocar-sheath assemblies (laparoscopic ports). The Veress needle is designed to achieve pneumoperitoneum prior to inserting laparoscopic trocars in a “closed” fashion.

The basic laparoscopic port consists of an outer hollow sheath or cannula that has a valve to prevent CO2 gas from escaping, a side port for instillation of gas, and a portal for instrument access. An inner removable trocar fits through the outer sheath and is used only while inserting the port through the abdominal wall. The most commonly used trocars are 5 mm and 10 mm in diameter, although ports ranging from 3 to 18 mm in diameter are available for specialized procedures. The principle choice of trocars is between reusable versus disposable. Reusable trocars are radiopaque and equipped with rotational trumpet valves and gaskets to prevent air leaks.

The Hasson’s cannula is used for gaining initial access to the abdominal cavity with an open cut down technique. It has a conical blunt tip, which is fitted into the cut down site and buttressed, in place with fascial sutures attached to the wings of the cannula.

Trocars



Surgical Instruments:

Many instruments have been designed specifically for laparoscopic surgery. These instruments are modifications of standard open-surgical instruments and are 30 to 40 cm in length with shaft diameters of 3 to 10 mm. The shafts of these instruments may be insulated with non-conductive material, and the working tips are metal to allow use with electrocautery and to provide durability.

A variety of graspers, scissors, dissectors and tissue manipulators are currently available, in both disposable and reusable forms. Clip appliers are the primary modality for ligating blood vessels and other tubular structures. The clips are made of titanium and range from 7 to 11 mm in length. Irrigation / aspiration probes are essential for most laparoscopic procedures in order to maintain a clear operative field.

Laparoscope cautery probes came with a variety of tips, including spatula, hook, and right angle configurations. Several precautions must be taken when using electrocautery during laparoscopic surgery. The shafts and handles of the cautery instrument must be well insulated to avoid inadvertent burns to the patient or operating surgeon. The entire tip of the cautery instrument must be well visualized endoscopically to avoid contact with other structures that could be cauterized or injured.

Patient Position and Room Set-up:

North American Approach:

The patient is kept supine in anti-Trendelenburg position (150 head up tilt) with left lateral tilt (15-200). This ensures that the bowel and omentum falls down and medially, away from the operative site. The operating surgeon and camera surgeon stand on the left of the patient while the assistant surgeon stands on the right of the patient. The monitor is kept beyond the right shoulder of the patient facing the operating surgeon. An additional monitor may be kept beyond the left shoulder of the patient for the assistant surgeon.

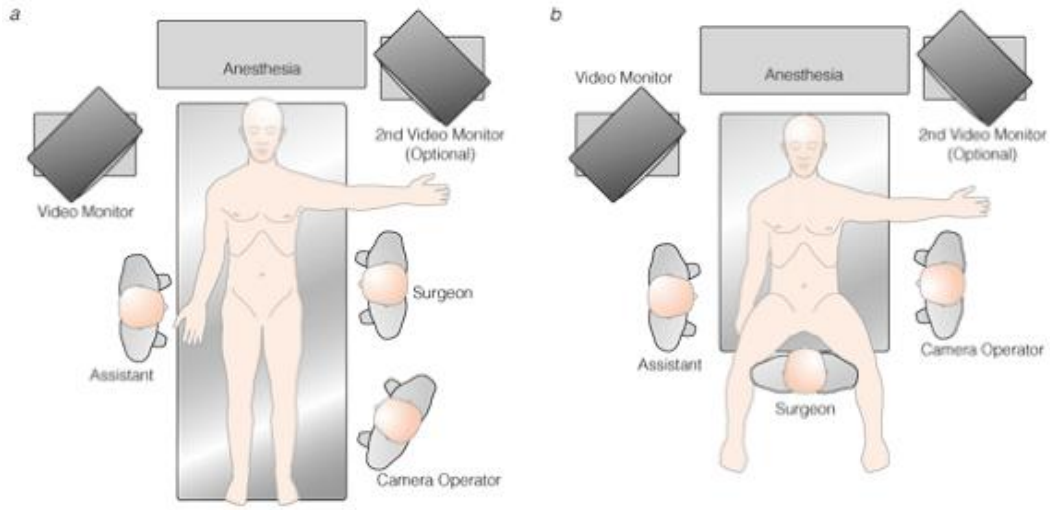
The camera port (10 mm) is placed in the midline, usually through the umbilicus. The remaining trocars are: 10 mm in the epigastric region, 5 mm in the mid-clavicular line sub-costallv and 5 mm in the anterior axillary line subcostally.

French/European Approach:

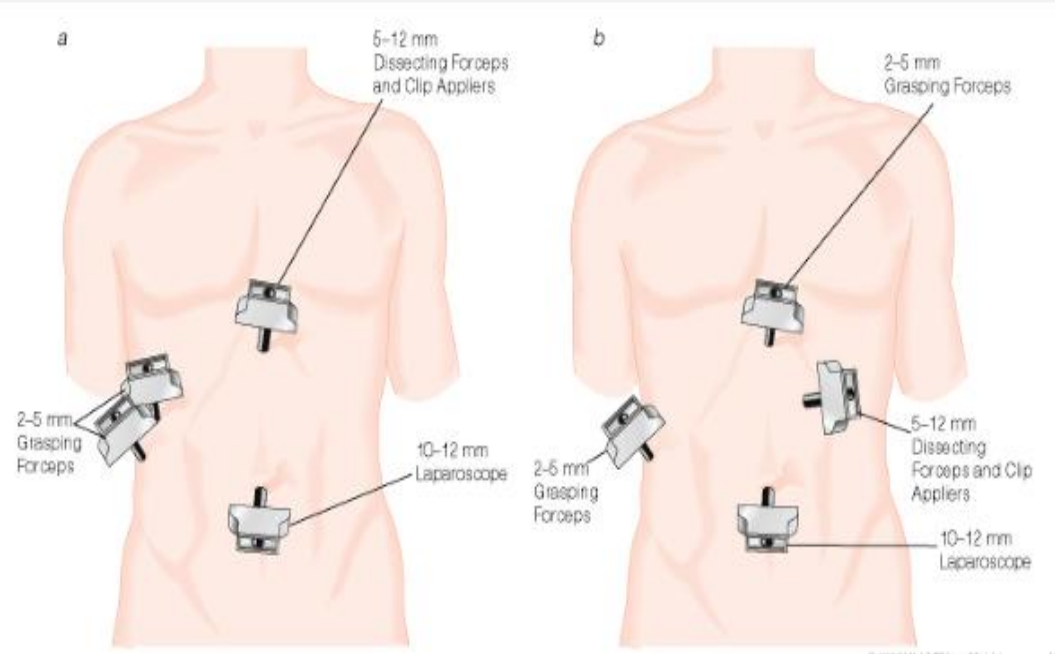
The patient is in semi-lithotomy anti-Trendelenburg position with the legs in Allen stirrups such that the thighs are almost parallel to the ground to avoid interference with the manipulations of the operating instruments. The operating surgeon stands between the legs of the

patient with the camera surgeon on the right of the patient and the assistant on the left of the patient.

The camera port placement remains the same as in the North American approach. Epigastric port (5 mm) is placed to allow retraction by the assistant. The right hand working port (10 mm) is placed in the left hypochondrium or in the midline between the camera port and the epigastric port. The left hand working port (5 mm) is placed in the right hypochondrium.



Shown are the positions of the surgeon, the camera operator, and the assistant in the Operating Room according to (a) North American positioning and (b) European positioning.



Differences between typical North American practice (a) and typical European practice (b) with respect to the placement of the trocars and the instruments inserted through each port.

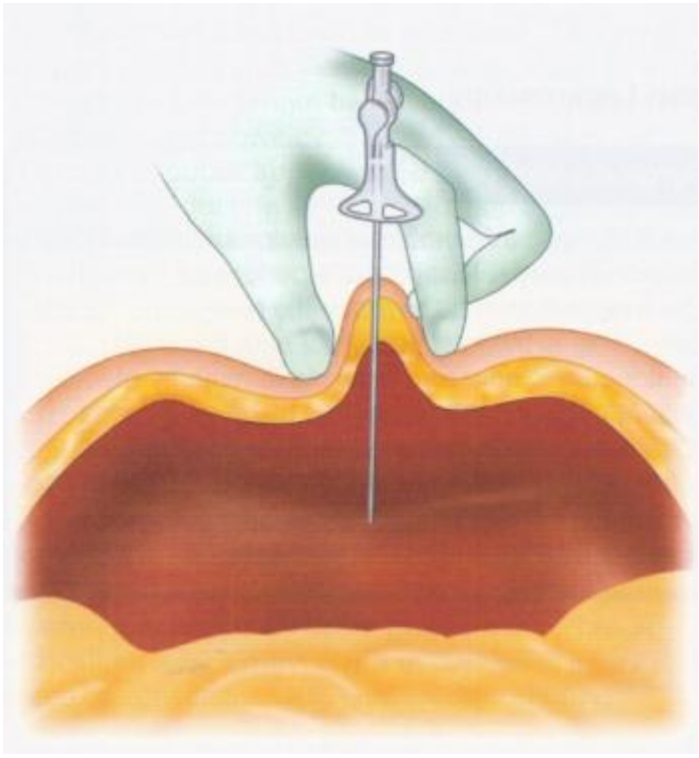
Technique:

1. Pneumoperitoneum and port placement:

Patient is positioned in supine with 10 to 20 degree head up to displace the intestines caudally. In the absence of operative scar, periumbilical site (thinnest site) is the most preferred site for Veress needle insertion. Depending on the shape of umbilicus, either a transverse or vertical stab is made with a number 15 or 11 knife.

The shaft of the Veress needle should be held by the right hand, keeping the distal length of the needle tip just adequate to traverse the entire thickness of the abdomen wall. While inserting the needle, the little finger and ulnar border of the right palm is propped against the abdomen.

The abdominal wall is lifted midway between the pubic symphysis and umbilicus by the left hand .The Veress needle is inserted either at a 45 degree caudal angle to the abdominal wall (in the asthenic or minimally obese patient) or perpendicular (in the markedly obese patients).



Veress needle insertion

Several maneuvers should be carried out to confirm the free intraperitoneal position of the needle. First, the needle is aspirated and irrigated to demonstrate the absence of return of blood or bowel contents and a free flow of fluid. Second, a saline drop test is performed in which the needle is filled with saline and fluid is demonstrated to flow freely by gravity into the peritoneal cavity as negative pressure is generated by lifting the abdominal wall. Finally, the needle is moved back and forth, which indicates that the tip is free within the peritoneal cavity. The needle is connected to the insufflator and CO2 is instilled at a rate of 1 L/min.

The opening pressure recorded on the insufflator should be < 10 mmHg. Initial pressures of 10 mmHg or higher may indicate the placement of the needle in the preperitoneal or other closed space. Upon insufflating approximately 1L of CO2, increased tympany in all four quadrants of the abdomen is confirmed, and the flow rate may be increased. Although high flow insufflators are designed to deliver flow rates of up to 8 to 10 L/min, the maximum flow rate through the small caliber Veress needle is approximately 2.5 L/min. Once the intra-abdominal pressure has reached 15 mmHg, generally requiring 3 to 6 L

of CO2, the Veress needle is removed, and the trocar is inserted through the same site.

The trocar is grasped firmly in the palm of one hand and inserted using gently firm pressure while elevating the abdominal wall with the other hand or with towel clips. Once the port is in, the inner trocar is removed, leaving the outer cannula and sheath in place. Return of CO2 gas is confirmed by opening either the stopcock or flapper valve on the port and then connecting the insufflation line to the sheath. The video telescope is inserted and a general inspection of the peritoneal cavity underlying viscera is carried out to assess for visceral injury.

The patient is placed in the anti-Trendelenburg position so that the intestines and viscera will fall downwards and to the left. The gallbladder is inspected. The remaining three trocars are inserted under vision. The epigastric port (10 mm) is inserted in the midline just below the liver edge or the costal margin, whichever is lower. The trocar is thrust in a rotatory movement so that it pierces the fascia and reaches the pre-peritoneal space. Then, it is turned right so that it enters the peritoneum at the base of the falciform ligament. This maneuver serves two purposes: (a) The trocar avoids injuring a vessel which sometimes runs in the free edge of the falciform ligament. (b) The instruments

through this port do not suffer interference from a falciform ligament hanging in front of them.

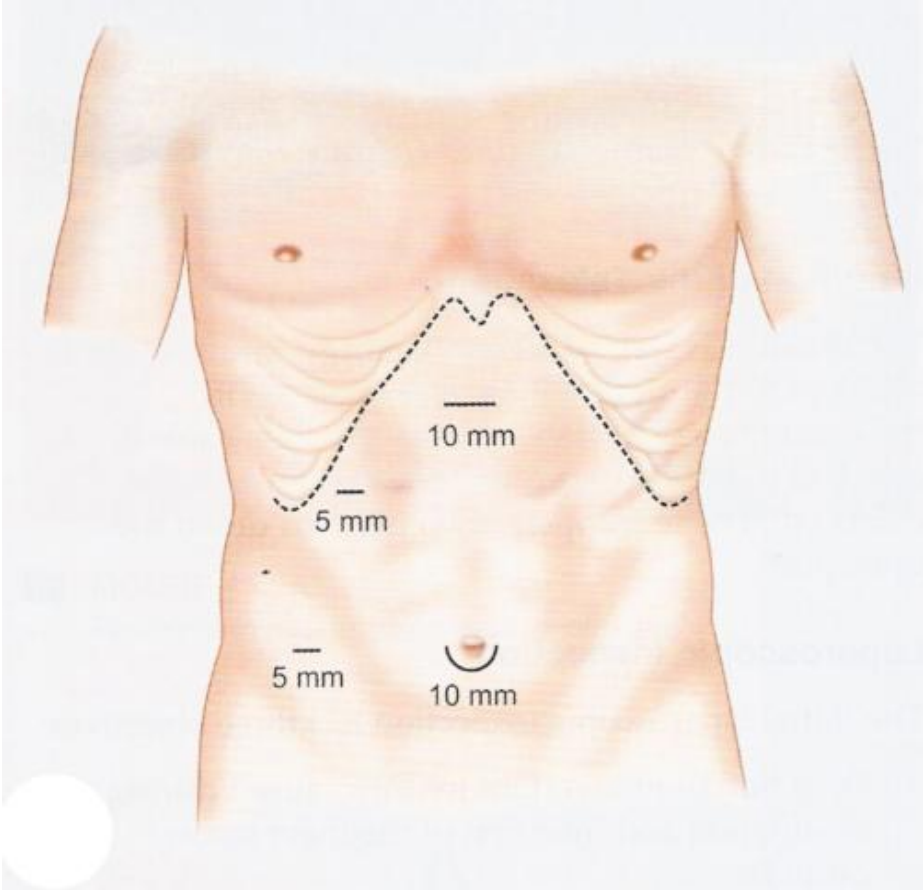
The mid-clavicular port (5 mm) is introduced at the same level, i.e., just below the liver edge or the costal margin, whichever is lower, right over the fundus of the gallbladder.

The lateral most port (5 mm) is introduced at the same level and just anterior to the lateral peritoneal attachment of the ascending colon.

Additional ports are sometimes required and may be placed as follows:

A. Left lumbar 5 or 10 mm for three prong or flat blade retractor for downward traction of the colon, omentum and duodenum. This maneuver gives wide exposure of the hilum.

B. 5 mm port midway between epigastric and right mid-clavicular ports for lifting the quadrate lobe using blunt tipped retractor, e.g. cirrhosis of the liver, left lobe gallbladder.



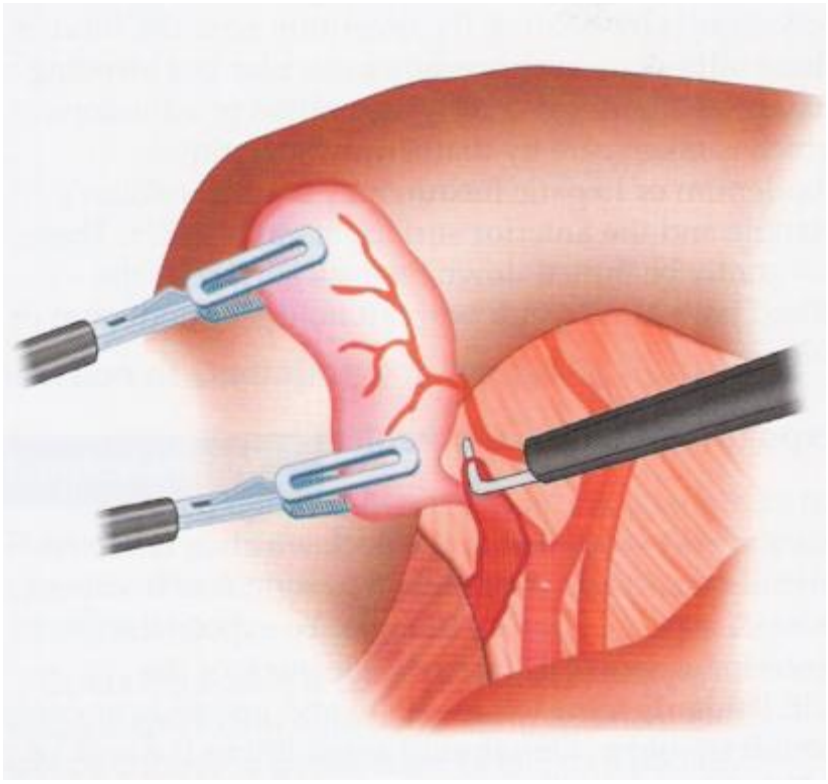
port position for laparoscopic cholecystectomy

2. Initial dissection:

The fundus of the gallbladder is held with a ratcheted grasper and retracted by the assistant in a cranial direction, which lifts the right lobe of the liver and exposes the Calot's triangle and hilum of the liver.

Adhesions to the underside of the liver and gallbladder are carefully taken down beginning near the hilus and proceeding down towards the neck. The adhesions should be retracted downwards with

the left hand grasper, to expose the plane of division. Adhesions may contain omentum, colon, stomach, and duodenum and hence must be dissected with care.



Dissection of cystic duct

3. Dissection of cholecystohepatic triangle:

An atraumatic (dolphin-nosed) non-locking grasper is introduced through the left hand working port to hold the infundibulum and retract it downwards and to the right.

Thus, the hepatocystic triangle is widened and opened up and the structures are placed under tension. By retracting the infundibular grasper laterally, the anterior aspect of the Calot's triangle is exposed. By retracting the infundibular grasper anteromedially, the posterior aspect of the Calot's triangle is exposed.

The dissection is begun on the infundibulum of the gallbladder. Using a Maryland's forceps introduced through the epigastric port, the peritoneum of the infundibulum is held and breached by giving very small bursts of cautery current. By a combination of cautery and blunt dissection, the peritoneum on the anterior and posterior surface is stripped down patiently always being careful to remain on the gallbladder side. The infundibular grasper is moved inferolaterally and superomedially (flag technique) to aid this dissection on the anterior and posterior surface of cholecystohepatic triangle respectively. The cholecystohepatic triangle is thus exposed.

4. Identification of the cystic duct and artery:

Now comes the most critical step of the operation - the identification of the cystic duct and artery. There are two well-described methods for ductal identification in laparoscopic cholecystectomy.

The first method has been referred to as the “infundibular” or “infundibularcystic” technique. In this method the cystic duct is isolated by dissection on the front and the back of the triangle of Calot and once isolated it is traced on to the gallbladder. Conclusive identification, i.e., the anatomic rationale for identification, occurs as a result of seeing the characteristic flare, as the cystic duct widens to become the gallbladder infundibulum. Often this is referred to as seeing a funnel shape i.e. the gallbladder should be seen to funnel down to terminate in the cystic duct. The infundibular method is the one usually found in texts describing the technique of laparoscopic cholecystectomy.

The second method is the “critical view of safety” technique, which was described in 1995. This method requires complete dissection of the cholecystohepatic triangle and separation of the base of the gallbladder infundibulum from the liver bed.

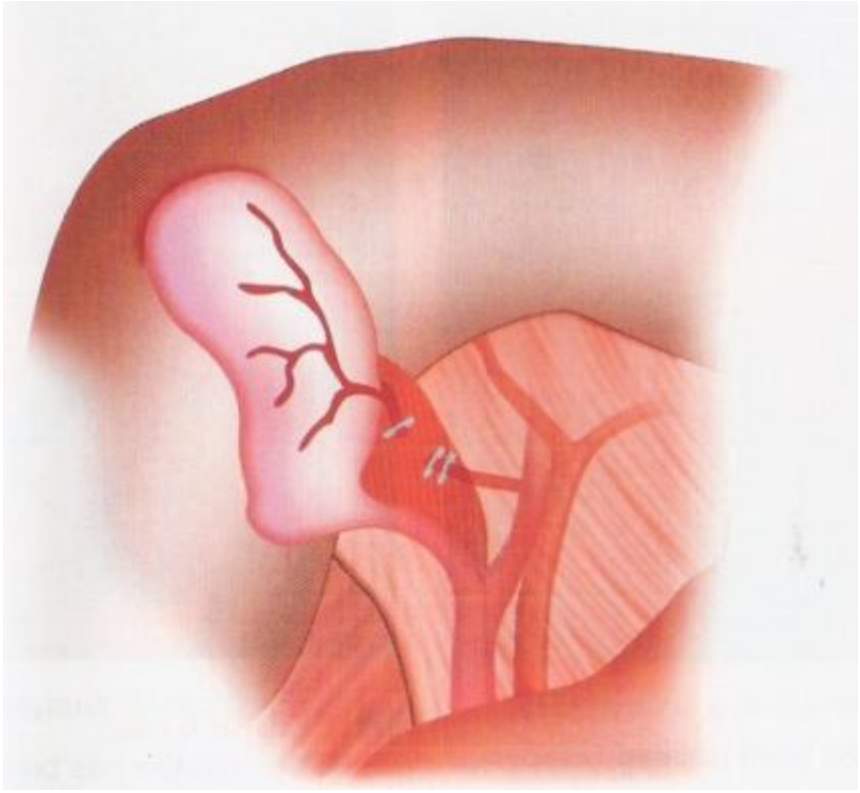
The anatomic rationale for identification of the cystic structures results from the fact that there are two, and only two, structures entering the gallbladder, which is otherwise still attached only by the upper part of the liver bed. The triangle of Calot is dissected free of all tissue except for cystic duct and artery, and the base of the liver bed is exposed. When this view is achieved, the two structures entering the

gallbladder can only be the cystic duct and artery. It is not necessary to see the common bile duct.

The cystic duct is identified at the junction with the gallbladder (safety zone) and followed down for an adequate length for cholangiography if desired. It is not always necessary to identify and dissect out the cystic-common duct junction (danger zone). Cystic artery is identified along with its anterior and posterior branches by blunt dissection using curved dissector within the cystic triangle avoiding any potential avulsion of the cystic artery off the right hepatic artery. The cystic node of Lund sometimes overlies the cystic artery. Attention is given to identify any unusual vascular or biliary tree anomalies. The main trunk of the cystic artery should be ligated and divided. Widely placed anterior and posterior branches are clipped individually and divided. Blind application of clips within the Calot's triangle should be avoided.

Both the cystic duct and the cystic artery are clipped, two clips on the cystic duct side and one clip on the gallbladder side. Though it is desirable to divide the artery before the duct, in selected situations, duct needs to be divided to expose cystic artery, hepatic artery, etc, and care

is taken not to give excessive traction till the cystic artery is clipped and divided.



Clipping of cystic artery

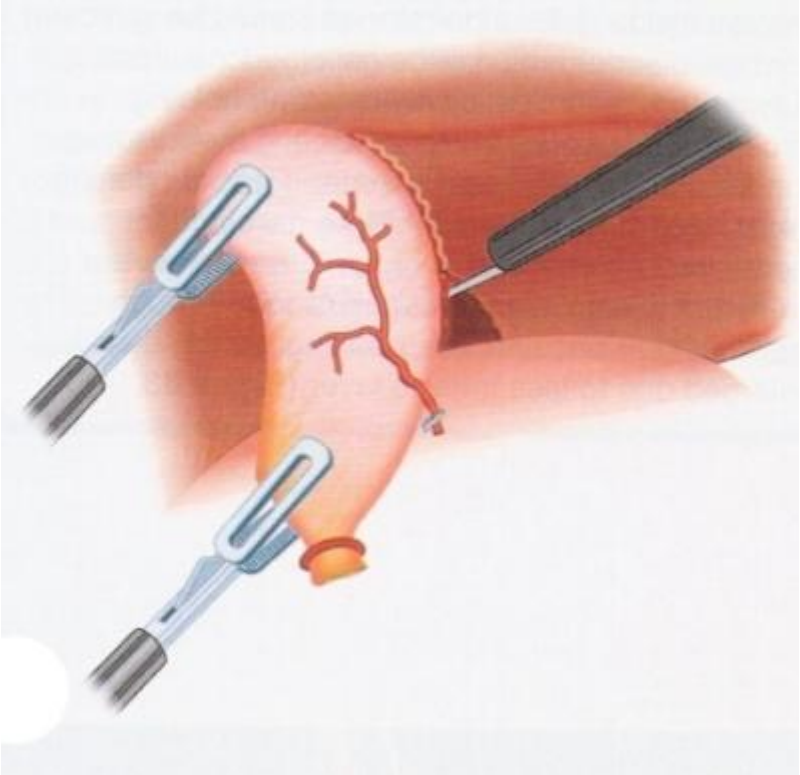
5. Detachment of the gallbladder from the liver:

The gallbladder can be detached from the liver bed using a variety of instruments - spatula with monopolar cautery, hook with monopolar cautery, scissors with monopolar cautery or Harmonic Scalpel. Surgeon's experience and familiarity with a particular device is the most

important aspect of choosing the best instrument for this purpose. Care should be taken to stay away from the porta hepatis and the liver bed and to avoid perforating the gallbladder. The infundibular grasper is used to elevate the gallbladder and alternately twist it to the left (medial rotation) and to the right (lateral rotation). A hook cautery is very useful for this phase of the operation. Prior to complete detachment of the gallbladder, the liver bed is inspected for adequate hemostasis or bile leak. The cystic duct remnant and cystic artery stumps are examined once again to ensure that the previously placed clips or sutures remain secure. Any minor oozing from the liver bed is controlled by application of cautery.

After achieving hemostasis, the remaining separation is carried out and gallbladder is extracted.

Dissection of gallbladder from its bed



6. Extraction of the gallbladder:

The extraction of the gallbladder can be carried out through the umbilicus or the epigastric port. A claw-shaped gallbladder extraction forceps is introduced and used to grasp the neck of the gallbladder. The forceps, cannula and the neck of the gallbladder are pulled out of the skin opening. If the gallbladder is too distended, the neck is opened and suction cannula is inserted to suck out the bile and if necessary, the stones are debulked through fragmentation by using a sponge holder. If

the gallbladder is thick, preventing its extraction fascial incision is extended to facilitate its removal.

7. Final inspection and irrigation:

After gallbladder extraction, the epigastric port is replaced and the surgical site is inspected for bleeding. A thorough wash is given to the gallbladder bed, Morrison's pouch, paracolic gutter and perihepatic areas with saline which is meticulously suctioned out.

8. Drainage and Closure:

If a drain is needed, it can be placed through the lateral-most port. A size 14F Romovac tube which goes through a 5 mm trocar is usually sufficient. If larger drainage tube is needed, it should be placed inside the peritoneal cavity through the epigastric port and brought out by a grasper through the lateral-most port in a reverse fashion.

The trocars are removed under direct vision to check that there is no bleeding from the trocar sites. Pneumoperitoneum is evacuated. The fascia of the 10 mm ports is closed with vicryl suture using port closure needle. Fascial closure is not required for the 5 mm ports. Skin closure is done using 3-0 vicryl subcuticular stitch/skin clip.

OPEN CHOLECYSTECTOMY TECHNIQUE

The location of the gallbladder on the posterior surface of the liver combined with the liver's residence beneath the ribs makes exposure a key aspect in the successful performance of a cholecystectomy. The right subcostal incision (8 to 12 cm) provides good, direct access to the liver, gallbladder and the extrahepatic biliary tree and is the standard incision. The limitation of this incision is in providing exposure to lower abdominal organs. In cases where the costal angle is narrow or access to the entire abdominal cavity is preferred, a midline incision may offer better exposure as it can be easily extended superiorly or inferiorly. The disfiguring Holman's incision, which combines a right subcostal with an upper midline, or the paramedian incision is now rarely used.

Retraction of the right costal margin is best accomplished with the aid of a retraction system that is fixed to the operating table. This provides steady retraction, spares a hand, and limits the need for additional assistants. The patient is placed in a reverse Trendelenburg position to help bring the liver down from under the costal margin and moist gauze packs may be placed behind the right hepatic lobe to bring the liver forward. Division of the falciform ligament, and using it as a

handle to lift the liver up, provides additional exposure. Alternatively, a retractor to lift the inferior aspect of the liver up may be used taking care not to tear the liver capsule. Moist packs are used to pack away adjacent structures and a wide hand-held or fixed retractor can be used to hold them in place. An orogastric or nasogastric tube is used for decompressing the stomach and enhancing exposure. Dense inflammatory adhesions to the colon or duodenum are often encountered and must be dissected free. Dissection in all instances should be performed close to the gallbladder wall. The presence of cholecystenteric fistulas must also be kept in mind.

The gallbladder fundus is grasped with a clamp for traction. A distended gallbladder may be difficult to grasp and may be aspirated to facilitate manipulation. During states of inflammation caused by cystic duct obstruction the absorptive capacity of the gallbladder mucosa is impaired by the mucosal toxin lysolecithin. As a result there is net secretion into the gallbladder with no outlet. This produces hydrops of the gallbladder and its characteristic whitish/clear gallbladder aspirate.

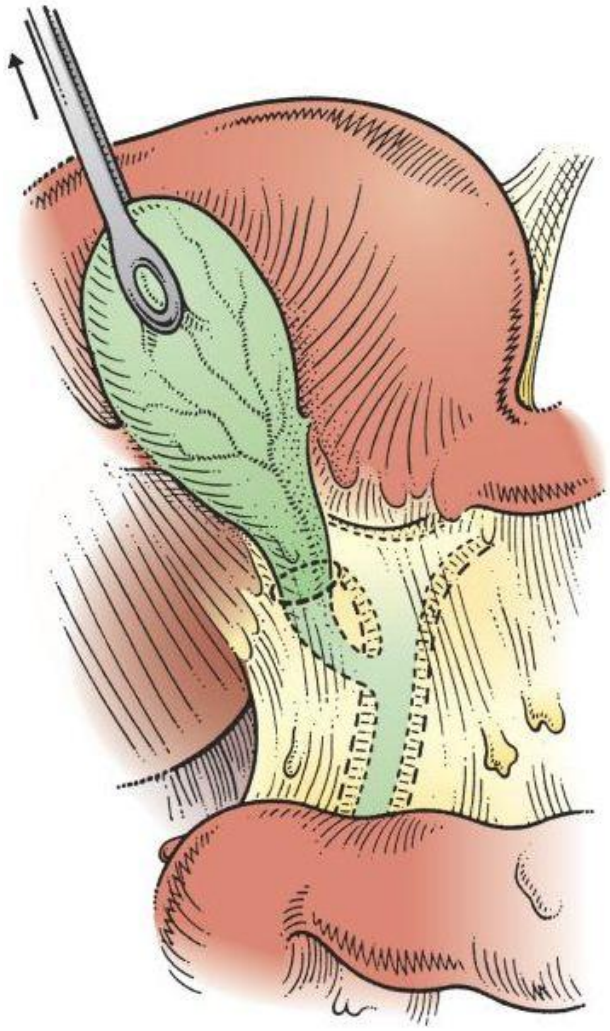
At this stage of the operation, the surgeon has two methods available to remove the gallbladder. Cholecystectomy from the neck toward the fundus can be used for straightforward cases in which there is minimal

inflammation and adhesions, and the components of the cholecystectomy (Calot's) triangle are easily identifiable. This is also the method used in laparoscopic cholecystectomy. When there is significant inflammation and adhesions that impede safe, adequate visualization of the triangle components, the safest method is cholecystectomy from the fundus toward the cystic duct.

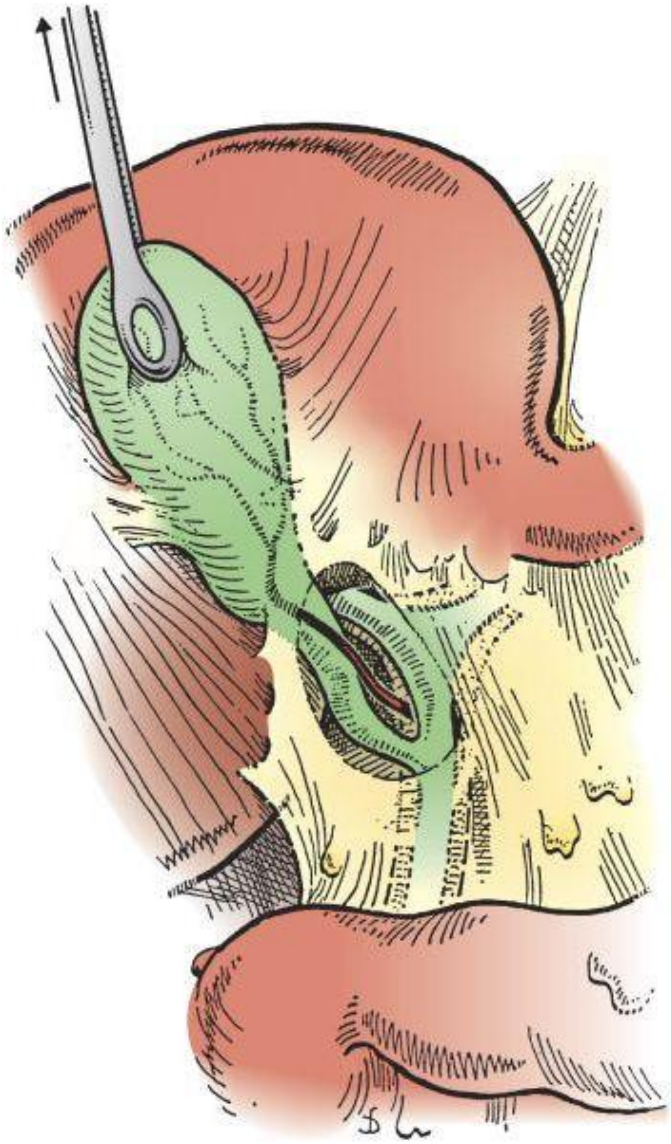
Neck-Toward-Fundus Approach

The operation commences with incising the peritoneal undersurface of the gallbladder and extending to the anterior aspect of the hepatoduodenal ligament. Another clamp may be placed on the infundibulum of the gallbladder and lateral and anterior traction applied to straighten the cystic duct away from the common bile duct. Too much traction may result in tenting of the common bile duct and mistakenly identifying it as the junction of the common bile duct and cystic duct. Blunt dissection of the triangle is performed to identify the cystic duct and its junction with the gallbladder and the common bile duct. The surgeon can then palpate the duct and identify stones and milk them back up into the gallbladder. At this point an intraoperative cholangiogram may be performed if there is a suspicion for a common bile duct stone. The common bile duct should be opened and explored if

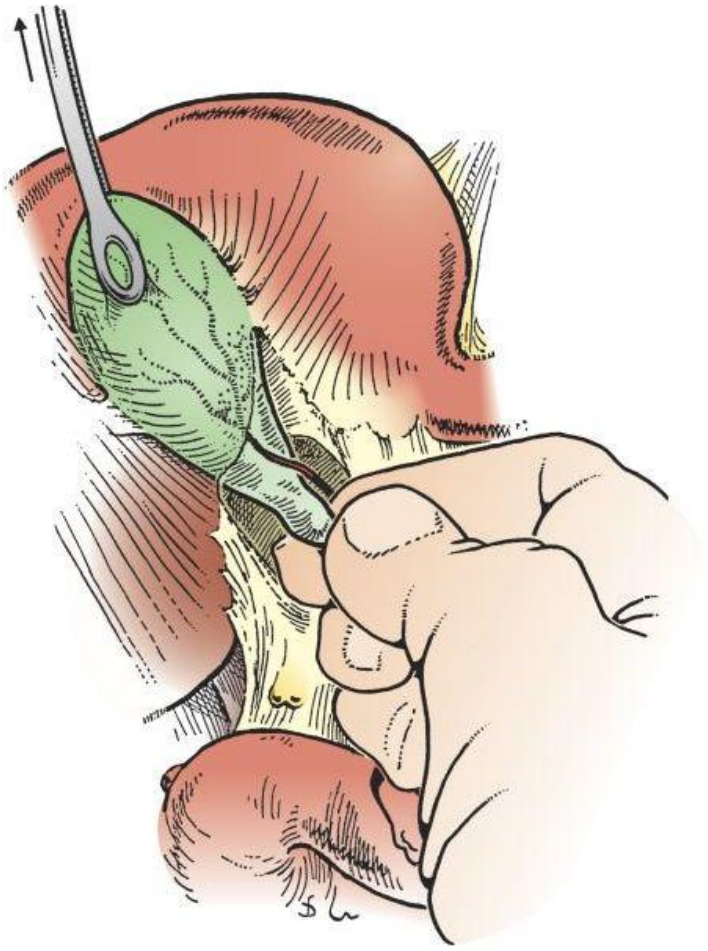
a stone is palpable within it or detected on cholangiogram. The cystic duct is sharply transected between clamps as close to the gallbladder as feasible to prevent injury to the common bile duct. The cystic duct stump is tied and reinforced with a clip. The length of the cystic duct stump, once thought to be related to post cholecystectomy syndrome, is not critical. It is far more important that the common bile duct not be injured



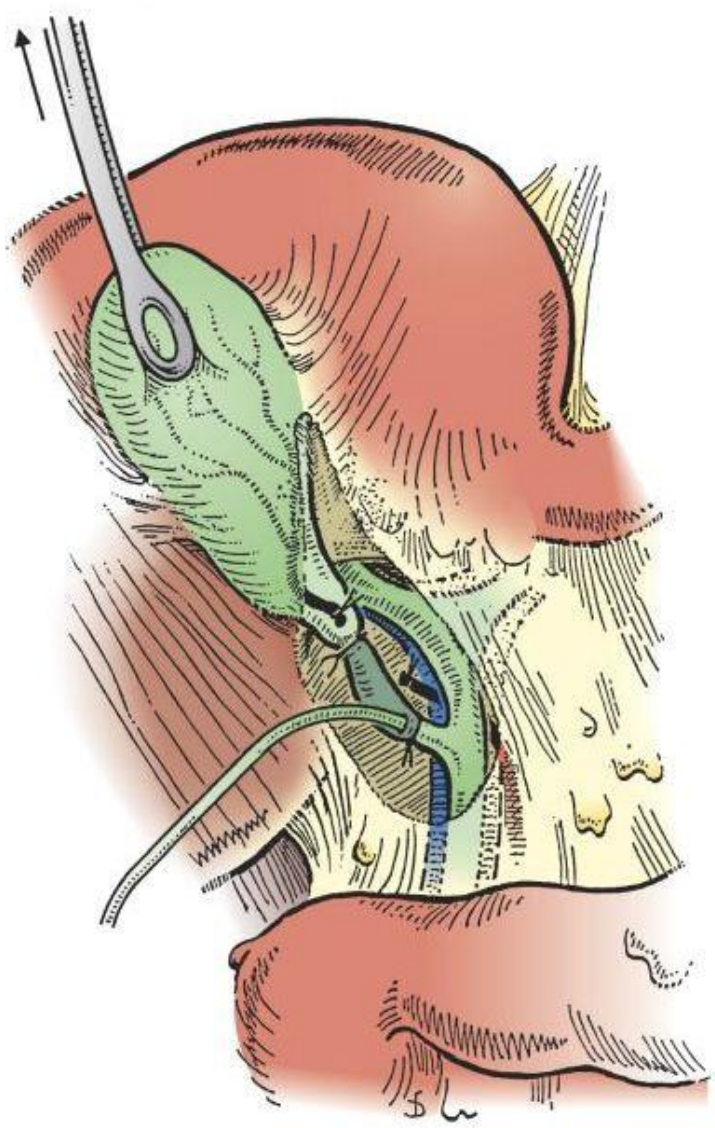
Cholecystectomy commences with adequate exposure of the gallbladder, grasping the fundus with a clamp to provide traction.



Neck-toward-fundus approach. Incising the peritoneum overlying the hepatoduodenal ligament will expose Calot's triangle.



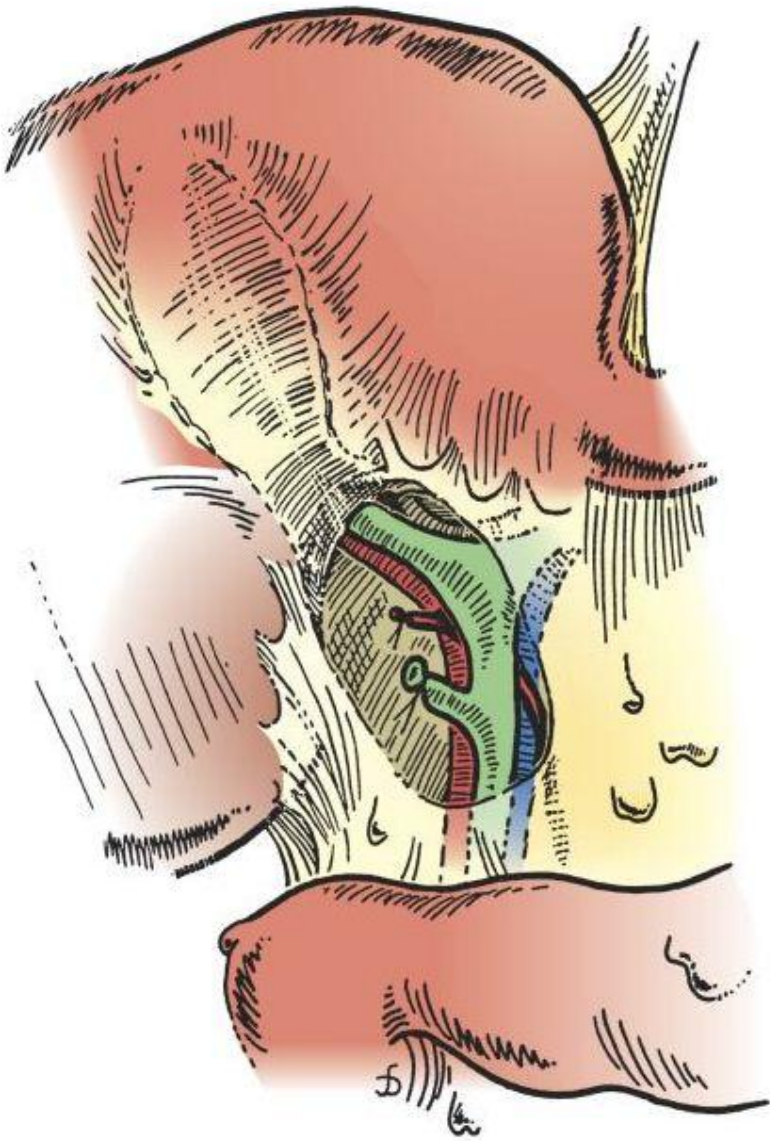
Digital palpation of the portal structures can identify stones in the cystic duct. The stones are gently milked back into the gallbladder.



Intraoperative cholangiogram can be performed to identify anatomy or if a common bile duct stone is suspected. (Optionally, the cystic artery may be divided prior to cholangiogram if it has been identified.)

The cystic artery usually lies superior to the cystic duct. The artery is dissected back to the gallbladder for confirmation. Once the cystic artery has been isolated and distinguished from a right hepatic artery, it is sharply divided between clamps and ligated. The proximal stump may be suture ligated or a clip may be applied for reinforcement.

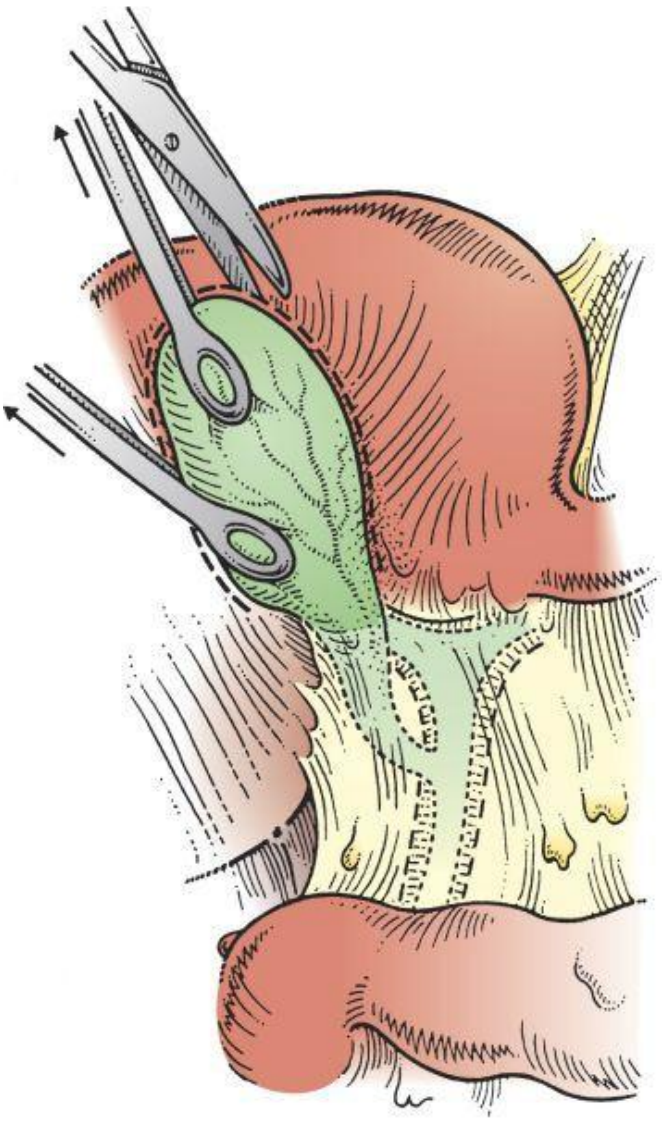
Once the cystic artery and cystic duct have been divided, the neck of the gallbladder should be free and dissection of the gallbladder from its hepatic fossa begins. Continuous upward traction on the neck of the gallbladder facilitates exposure of the investing peritoneum around the gallbladder and the alveolar tissue between the gallbladder and the liver. The gallbladder is freed from its fossa by a combination of sharp, blunt, and electrocautery dissection. This continues all the way up to the fundus until the gallbladder is free. Occasionally there may be aberrant bile duct branches from the right hepatic or common hepatic ducts communicating directly with the cystic fossa, the so-called ducts of Luschka. These may be clipped and divided. In cases of postoperative bile leak, these ducts often cease draining spontaneously. The gallbladder bed and cystic artery are inspected for hemostasis.



View of the gallbladder fossa on completion of the cholecystectomy with intact cystic artery and Fundus-Down Approach

The fundus-down method is a safe way of performing a cholecystectomy and is especially useful in the cases of cholecystitis where the neck of the gallbladder, cystic duct, cystic artery, and the hepatoduodenal ligament are obscured by inflammation and adhesions. Dissection of the fundus initially, releasing the gallbladder from the liver, and subsequent identification of ductal and vascular structures can reduce the rate of inadvertent injury by revealing planes of dissection away from the most densely adherent inflamed portions.

An incision is made in the gallbladder serosa at the tip of the fundus near the liver edge. A subserosal plane is developed between the gallbladder and the liver on each side. The fundus is grasped with a clamp, and downward traction is applied as the gallbladder is taken out of the fossa by sharp and blunt dissection. Another clamp on the gallbladder can be used to manipulate the gallbladder laterally and medially during the dissection. With inflammation and edema, this plane is easily dissected sharply.



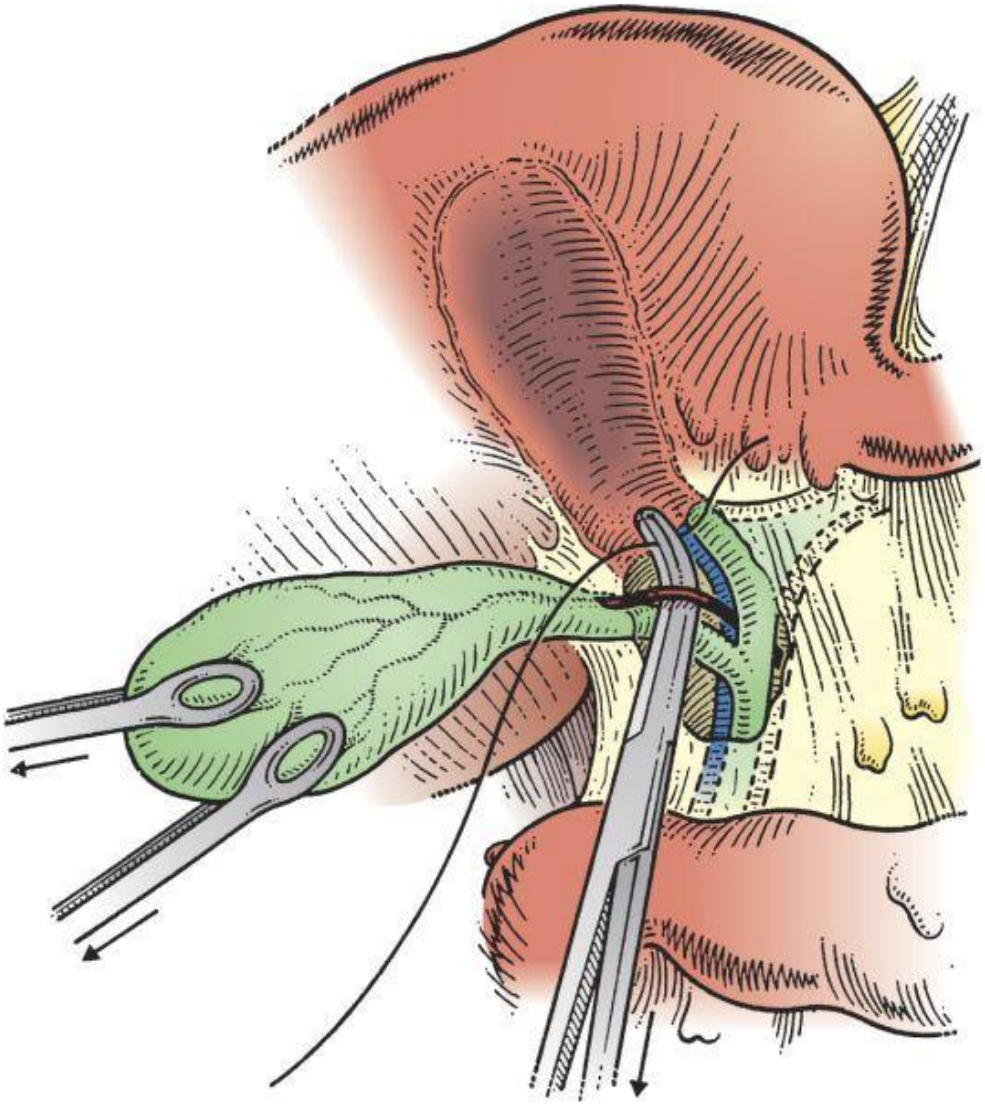
Fundus-toward-neck approach. The peritoneum over the gallbladder, close to the liver edge at the tip of the fundus, is incised.

A plane is developed between the liver and the gallbladder wall. The second clamp can facilitate maneuvering of the gallbladder laterally and medially. In cases of acute inflammation, the surgeon can take advantage of the edema commonly found in this plane. The plane is

most easily created by sharp dissection, but electrocautery may also be used.

It is best not to aspirate the contents of the gallbladder since it is easier to identify the wall of the gallbladder when it is full and helps define the plane of dissection. However, if it interferes with grasping or visualization, it may aspirated as described earlier. A useful maneuver in dissecting a collapsed gallbladder is to place a finger inside the gallbladder and use it as a guide for the gallbladder wall.

When the infundibulum and neck is reached, the cystic artery will be encountered entering the gallbladder wall. The cystic artery is sharply divided between clamps and ligated close to the gallbladder. Light traction on the gallbladder and skeletonization of the infundibulum will reveal the cystic duct. The cystic duct, common bile duct, and common hepatic duct should be identified. The cystic duct is then clamped close to the gallbladder and then sharply divided between two clamps and ligated. The gallbladder is removed from the field. The cystic duct stump may further be suture ligated or reinforced with clip. The gallbladder fossa and cystic artery stump are inspected for hemostasis.



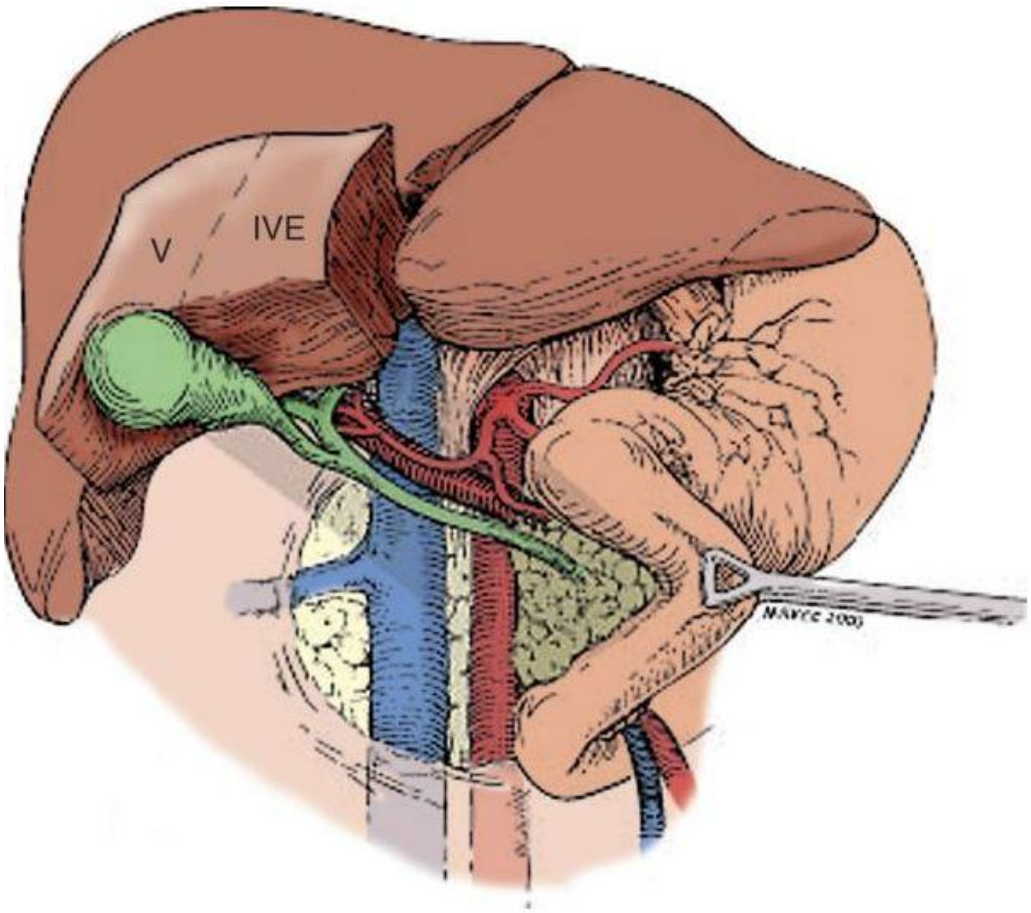
During this dissection toward the gallbladder neck, the first structure encountered will be the cystic artery as it enters the gallbladder. It is appropriately ligated and divided.

The use of a closed suction drain is only indicated if the surgeon is concerned about identifying or controlling a bile leak. The drain is placed in the gallbladder fossa and brought out through a separate lateral stab incision. The drain is removed when the output is low and nonbilious. The abdominal incision is closed in one or two layers using a monofilament absorbable suture. The skin can almost always be closed primarily except in cases of the most infected gallbladder fossa.

Radical Cholecystectomy Surgery

The standard template on which all operations for gallbladder cancer should be based is the extended cholecystectomy. This consists of cholecystectomy with en bloc resection of segments IVB and V and lymphadenectomy of the cystic, pericholedochal, periportal, and posterior pancreaticoduodenal lymph nodes residing in the hepatoduodenal ligament, as well as local interaortocaval lymph nodes. Knowledge of a patient's tumor stage and familiarity with the general biologic proclivities of gallbladder cancer permit the surgeon to specifically tailor surgical therapy to the individual oncologic needs of each patient. For example, the lymphadenectomy can often be performed by simply skeletonizing the porta hepatis. However, in cases of prior dissection, where scar formation in the porta hepatis may blur

the distinction between tumor and postoperative change, or in patients with infundibular tumors extending into the region of the common bile duct, or in obese patients, resection of the extrahepatic biliary system with Roux-en-Y hepaticojejunostomy reconstruction may be necessary to complete the lymphadenectomy with negative margins.



Portal lymphadenectomy and radical cholecystectomy with en bloc segment IVB/V hepatic resection for gallbladder cancer.

DEFINITION

- Gall bladder carcinoma (GBC) found on

– histopathology

– after the gall bladder has been removed for

– symptomatic benign gall bladder diseases

• gall stones,

• cholecystitis and

• GB polyps with or without gallstones

INCIDENCE

• Incidental GBC accounts for

– 70% of all patients diagnosed with GBCs, whereas

– 30% of cases are suspected pre-operatively

• The incidence of incidental GBC is 0.2-3% of all cholecystectomies

• This is due to the wide range of Laparoscopic Cholecystectomy (LC) procedures being carried out for benign GB disease

• However this expect to be decreasing due to wide spread use of ultrasound scanning for upper abdominal symptoms suggestive of GB disease

- Incidental GBC is 2-3 times more common in women than in men and its frequency increases with age

AETIOLOGY

- The pathogenesis:
  - not clear but is probably related to chronic inflammation
- Various factors have been implicated in the etiology-pathogenesis

a) Gallstone (75-90%) of cases

b) Porcelain GB (calcified GB associated with > 20% incidence of GBC

c) Choledochal cyst + adenomatous GB polyps

d) Anomalous of pancreato-biliary junction

e) Primary sclerosing cholangitis

f) Obesity

*g) Salmonella typhi*infection

h) Smoking: increases the risk of developing GBC due to

exposure to various carcinogens excreted via bile

PATHOLOGIC FEATURES

- GBC can be categorized into:
  - a) infiltrative: commonest
  - b) nodular
  - c) papillary, or
  - d) combined forms
- The infiltrative tumours causes thickening and induration of the GB wall, sometimes extending to involve the entire GB.

PATHOLOGIC FEATURES

- Most GBCs are of EPITHELIAL ORIGIN
- Histological subtypes include:
  - a) Adenocarcinoma
  - b) Squamous
  - c) Adenosquamous
  - d) Oat cell (less common)
- Adenocarcinomas demonstrate papillary features histopathologically and are commonly diagnosed while localized to the GB and are associated with an improved overall survival

MODE OF SPREAD

GBC spreads by:

a) Lymphatic

b) Haematogenous

c) Intraperitoneal (seeding)

d) Luminal spread via cystic duct (intraductal)

e) Direct anatomic spread involving contiguous organs

- Spread by lymphatic is the most common and is an important mode of dissemination.
- Spread by venous drainage is via cholecystic venous plexus to a variable number of cholecystic veins.
- These cholecysto-hepatic veins directly enter into middle hepatic veins.
- This venous spread forms the basis of excision of the middle liver segments (4b and 5 or 4,5 and 8) as part of radical procedure

- Intraperitoneal spread is common and generally involves the adjacent organs like liver , CBD, colon, doudenum, pancreas, omentum, and stomach

- Intraductal spread along the lumen and the wall of the ducts is rare and is usually seen in papillary type of GBC

STAGING

- The appropriate management and overall prognosis are strongly dependent on tumuor staging

- The American joint committee on cancer (AJCC) TNM staging for GBC seventh edition (2010) is used.

Staging Primary Tumor

- Tx : Primary tumor cannot be assessed

- T0: No evidence of primary tumor

- Tis: Carcinoma in situ

- T1a: Tumor invades lamina propria

- T1b: Tumor invades muscle layer

- T2: Tumor invades perimuscular connective tissue, no extension beyond serosa or into liver

- T3: Tumor perforates the serosa and / or invades structures such as the stomach, duodenum, colon, pancreas, omentum or extra hepatic bile duct.

- T4: Tumor invades main portal vein or hepatic artery, or two or more extrahepatic organs or structuresstructures

Staging Regional Lymph Nodes

- Nx: Regional lymph nodes cannot be assessed.

- N0: No LN metastasis

- N1: Metastasis to nodes along the cystic duct, CBD, hepatic artery and or portal vein

Staging Distant Metastases

- M0 No distant metastases
- M1 Distant metastases.

Anatomic Stage / Prognostic Groups

- Stage 0 Tis No Mo
- Stage I T1 No Mo
- Stage II T2 No Mo
- Stage IIIa T3 No Mo
- Stage IIIb T1-3 N1 Mo
- Stage IVa T4 No-1 M1
- Stage IVb Any T Any N M1

HISTOLOGIC GRADE (G)

- Gx Grade cannot be assessed
- G1 Well differentiated tumour
- G2 Moderately differentiated tumour
- G3 Poorly differentiated tumor
- G4 Undifferentiated tumourtumour

CLINICAL PRESENTATION

- Usually asymptomatic
- Some patients present with signs and symptoms which are generally indistinguishable from cholecystitis and cholelithiasis e.g. RUQ abdominal pain, abdominal discomfort, nausea and vomiting
- Less common presentations include jaundice, weight loss, anorexia and abdominal mass
- The least presentations are signs of GIT bleeding or obstruction

INVESTIGATIONS

- All the images use for biliary tract investigation are insensitive for incidental GBC.
- Early lesions confined to the GB wall may be missed especially in the presence of GB-Stones.

MANAGEMENT

- Incidental GBC is a difficult management issue as there are no established guidelines
- The appropriate operative procedure for the patient with GBC is determined by the pathologic stage
- The extent of surgical excision remains controversial

Stage I: P Tis and P T1

- P Tis and P T1
- The tumour removed through cholecystectomy as is done for benign GB disease
- Open or LC is adequate treatment for Tis and T1
- P T1b: Simple cholecystectomy with LN dissection has been recommended

MANAGEMENT

Stage II and III: PT2 and PT3

- Additional radical surgery is needed to achieve a tumour free surgical margin, along with lymph node dissection
- Radical re-resection may include liver resection, and / or extra hepatic bile duct resection and LN dissection
- This has been the operation of choice for pT2 and pT3 GBCs ,and it has shown significant survival benefit.

- A study done in France by Fuks and colleagues validates the concept of re-resection in PT2 and PT3 GBC, but no bile duct resection

- According to Fuks, bile duct resection increases post-operative morbidity but does not improve survival

- Liver resection may takes several forms such as hepatic segmentectony of 4b and 5, or right hepatectomy for tumours involving the right hepatic portal triad.

MANAGEMENT

Stage IV:

- PT4
- Rarely diagnosed as incidental GBC
- Presents as metastatic disease
- Presence of distant metastasis is considered irresectable

Radiotherapy

- The alternative to further radical resection and lymph node dissection(RR-RL) is radical radiotherapy to the gallbladder bed and lymphatic drainage area .
- Simple cholecystectomy and adjuvant external radiotherapy (SC-ERT) can be recommended for Stage 1b disease only as an alternative to additional radical surgery for patients not keen to undergo second operation or who are at high risk for general anesthesia and major surgery.

Role Of Adjuvant Radical Radiotherapy

- In stages II and III addition of radical surgery is superior to radiotherapy
- Patients with nodal metastasis beyond the pericholedochal nodes should not be considered for curative resection

PROGNOSIS AND OUTCOME

- The survival rate with incidental GBC is related to stages
- pT1 disease treated with a cholecystectomy has an excellent prognosis (90 – 100% 5 yearssurvival rate)

PROGNOSIS AND OUTCOME

- For pT2 and pT3 lesions who underwent additional radical surgery to achieve a tumour free surgical margin along with lymph nodes dissection , the
  - 1- years survival rate was 87%,
  - 3- years survival rate was 73%, and
  - 5- years survival rate was 47%

Palliation

Because of the extremely high likelihood of surgical unresectability, comprehensive care for patients with gallbladder cancer must include an armamentarium of palliative procedures. Unfortunately, the median survival of patients with unresectable gallbladder cancer is typically only 2 to 4 months (with a 1-year survival <5%). Therefore, effective palliation should be accompanied by minimal risk of morbidity. Surgical palliation in the form of a segment III biliary bypass provides a relatively simple means of durable biliary decompression due to its distance from the gallbladder and hepatic hilum.[44] However, percutaneous biliary drainage may provide a more reasonable method of palliation when the expected duration of survival is brief. Whenever feasible, port site recurrences after prior laparoscopic cholecystectomy should be resected to prevent the pain and local cutaneous complications associated with necrotic abdominal wall wounds. Palliative chemotherapy has not shown a consistent benefit; palliative radiation therapy may provide minimal prolongation of median survival.

Follow-up care

After having completed treatment. Patient will be called for follow-up appointments. During these visits, patient will be asked about symptoms, physical examinations will be done, and blood tests such as LFT or imaging tests such as CT scans will be done.

After treated with surgery and have no signs of cancer remaining, follow-up with imaging tests will be done about every 6 months for at least the first 2 years. Follow-up is needed to check for cancer recurrence or spread, as well as possible side effects of certain treatments.

OBSERVATIONS AND RESULTS

OBSERVATIONS AND RESULTS

Descriptive Statistics

	N	Minimum	Maximum	Mean	Std. Deviation
AGE	100	18	84	43.73	14.548
Valid N (listwise)	100				

GENDER = F

Descriptive Statistics[a]

	N	Minimum	Maximum	Mean	Std. Deviation
AGE	78	18	70	40.60	13.548
Valid N (listwise)	78				

a. GENDER = f

GENDER = M

Descriptive Statistics[a]

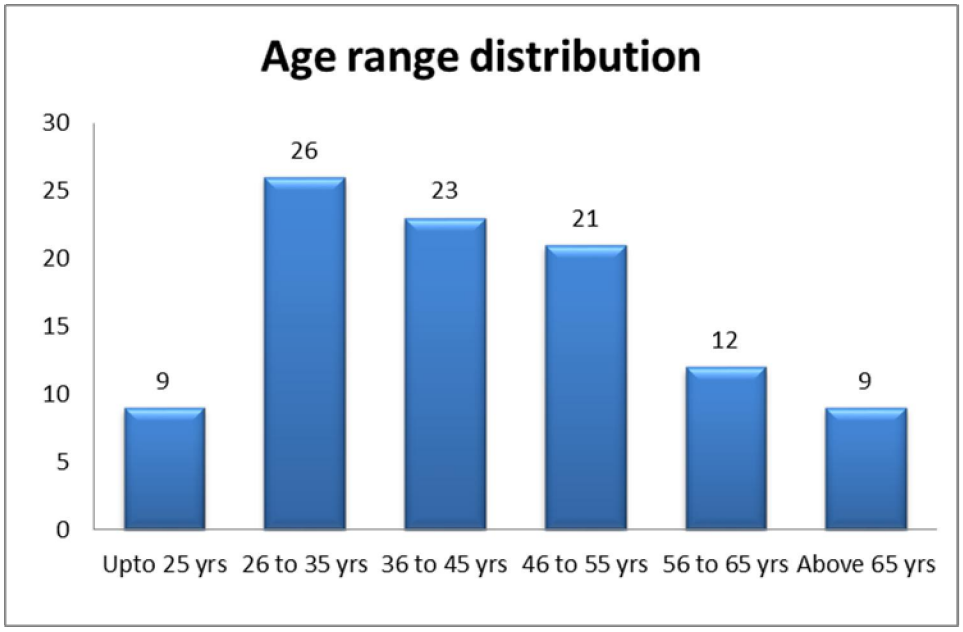
	N	Minimum	Maximum	Mean	Std. Deviation
AGE	22	30	84	54.82	12.633
Valid N (listwise)	22				

a. GENDER = m

FREQUENCIES

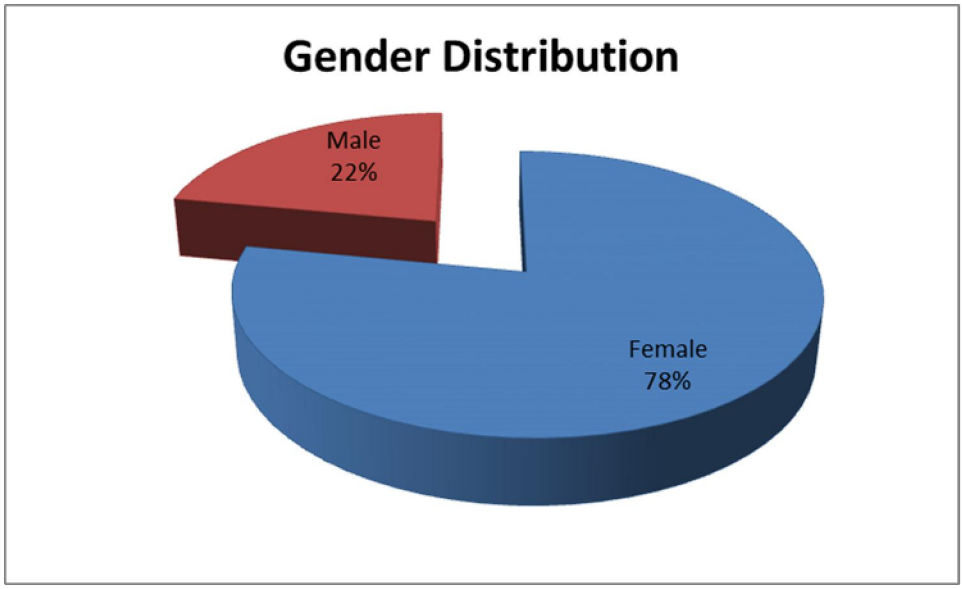
Agerange

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Upto 25 yrs	9	9.0	9.0	9.0
	26 to 35 yrs	26	26.0	26.0	35.0
	36 to 45 yrs	23	23.0	23.0	58.0
	46 to 55 yrs	21	21.0	21.0	79.0
	56 to 65 yrs	12	12.0	12.0	91.0
	Above 65 yrs	9	9.0	9.0	100.0
	Total	100	100.0	100.0	



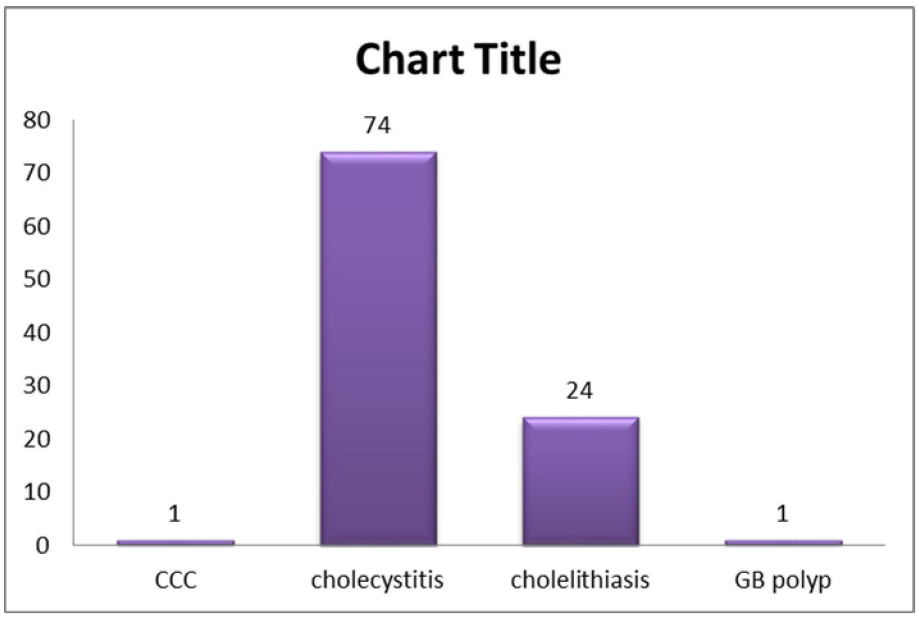
GENDER

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Female	78	78.0	78.0	78.0
	Male	22	22.0	22.0	100.0
	Total	100	100.0	100.0	



US

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	CCC	1	1.0	1.0	1.0
	cholecystitis	74	74.0	74.0	75.0
	cholelithiasis	24	24.0	24.0	99.0
	GB polyp	1	1.0	1.0	100.0
	Total	100	100.0	100.0	



SURGERY

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	lap cholecystectomy	79	79.0	79.0	79.0
	open cholecystectomy	21	21.0	21.0	100.0
	Total	100	100.0	100.0	

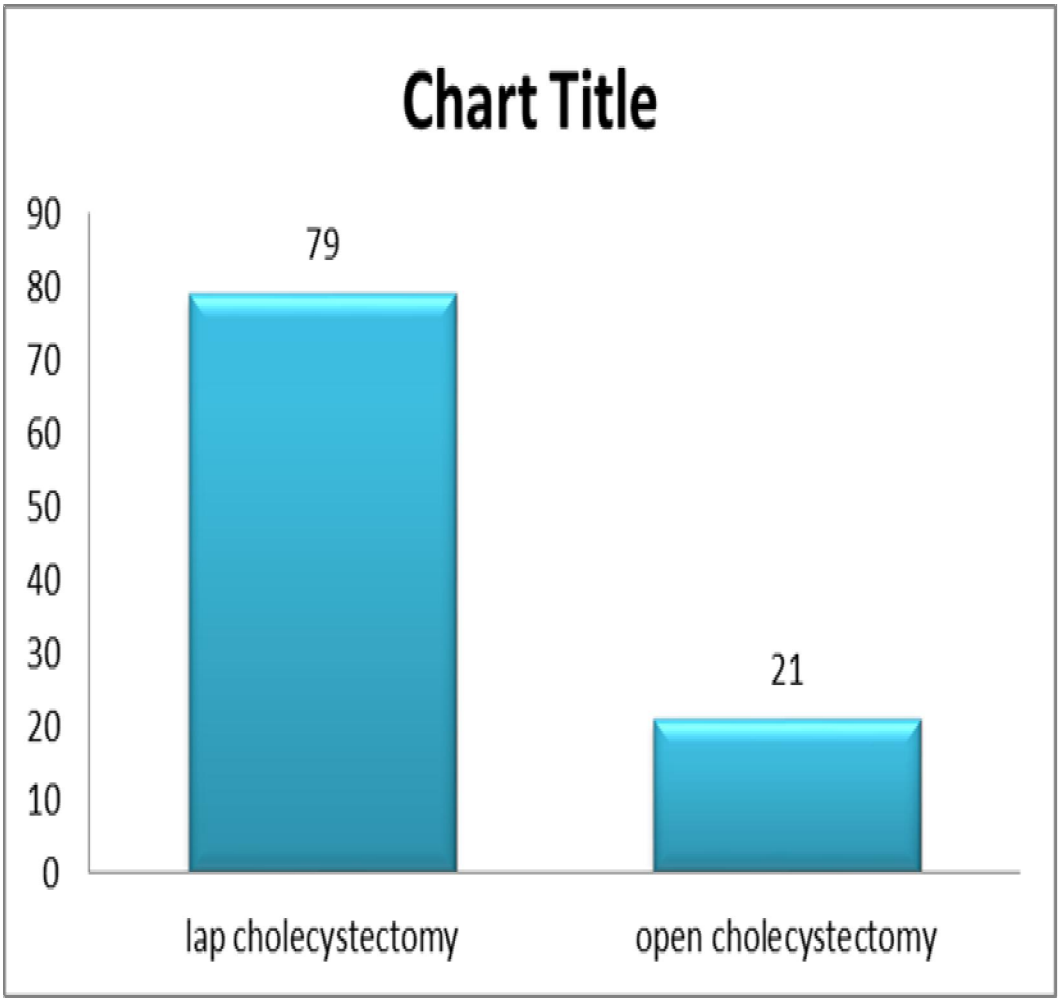


Chart Title
90
80
70
60
50
40
30
20
10
0
79
21
lap cholecystectomy
open cholecystectomy

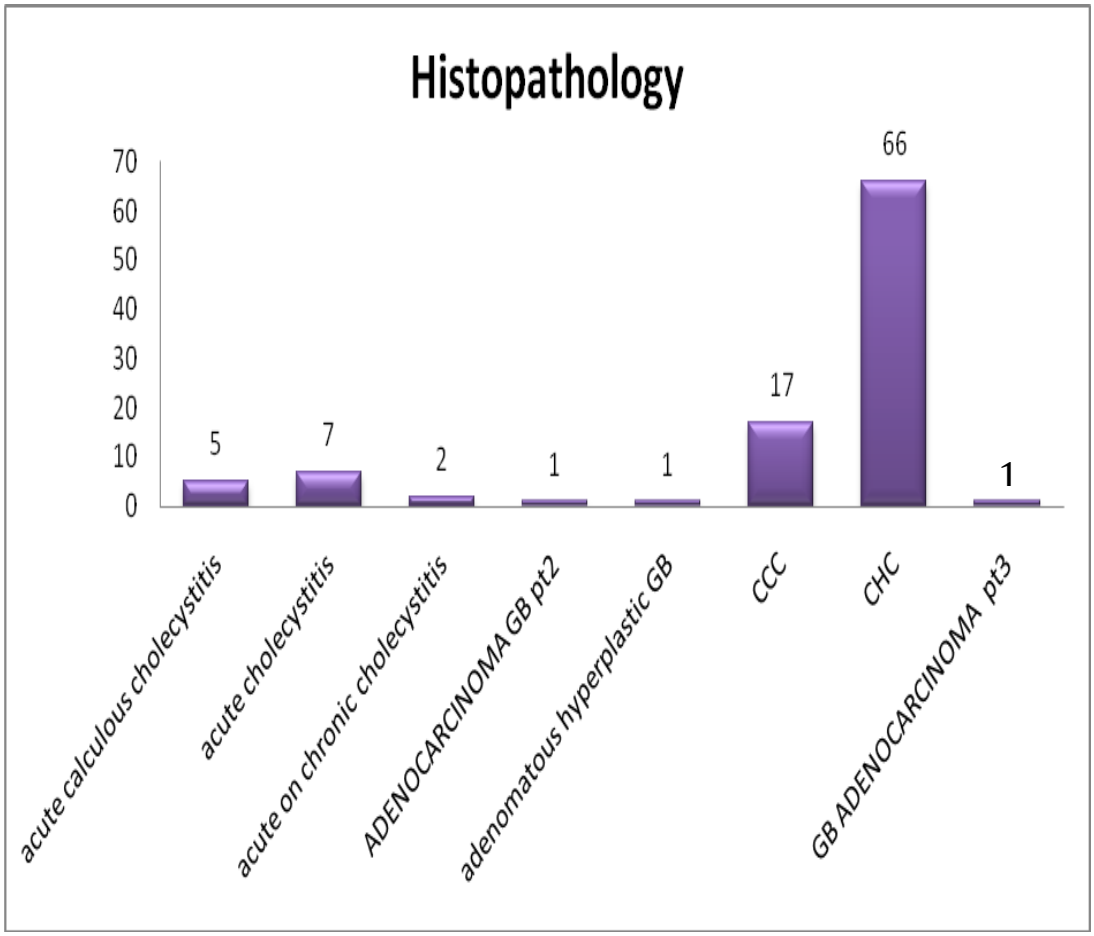
		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	acute calculous cholecystitis	5	5.0	5.0	5.0
	acute cholecystitis	7	7.0	7.0	12.0
	acute on chronic cholecystitis	2	2.0	2.0	14.0
	ADENOCARCINOMA GB pt2	1	1.0	1.0	15.0
	adenomatous hyperplastic GB	1	1.0	1.0	16.0
	CCC	17	17.0	17.0	33.0
	CHC	66	66.0	66.0	97.0
	GB ADENOCARCINOMA pt3	1	1.0	1.0	100.0
	Total	100	100.0	100.0	

CCC – Chronic Calculous Cholecystitis

CHC - Chronic Cholecystitis

GB – Gall Bladder

LAP – Laparoscope


Histopathology
70
60
50
40
30
20
10
0
5
7
2
1
1
17
66
1
acute calculous cholecystitis
acute cholecystitis
acute on chronic cholecystitis
ADENOCARCINOMA GB pt2
adenomatous hyperplastic GB
CCC
CHC
GB ADENOCARCINOMA pt3

CLINICAL SYMPTOMS

		Frequency	Percent	Valid Percent	Cumulative Percent
Valid	Dyspepsia	22	22.0	22.0	22.0
	epigastric pain	12	12.0	12.0	34.0
	nausea/vomiting	10	10.0	10.0	44.0
	pain rt hypochondrium	56	56.0	56.0	100.0
	Total	100	100.0	100.0	

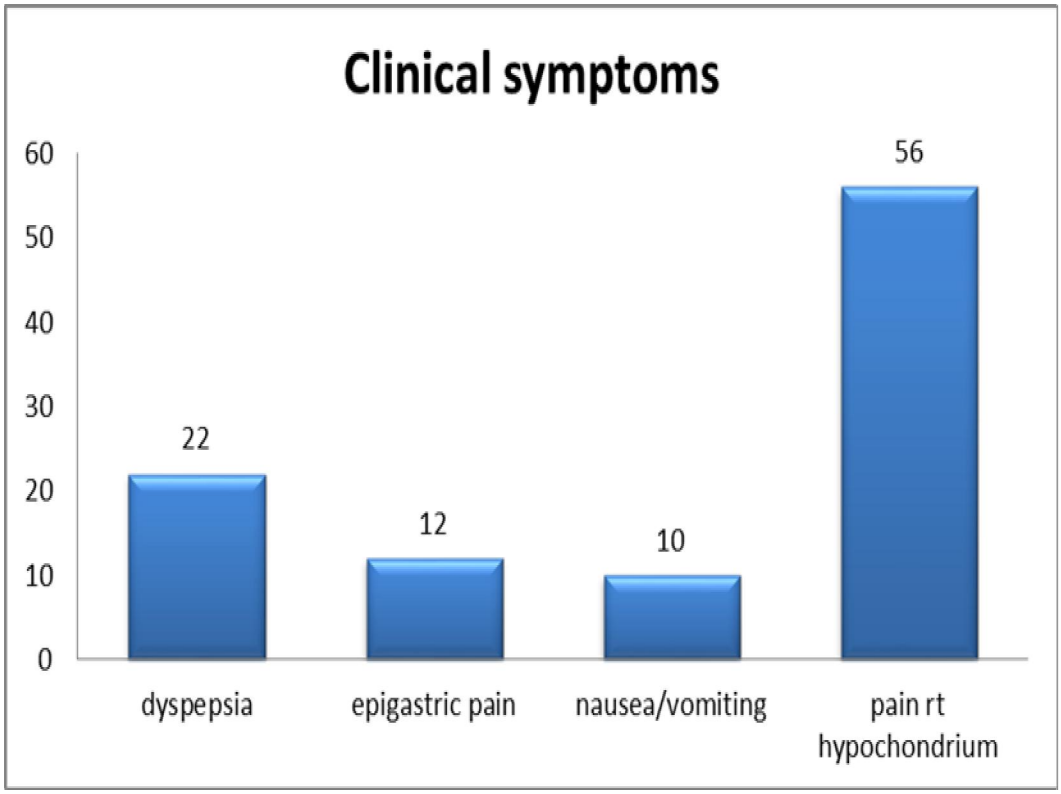

Clinical symptoms
60
50
40
30
20
10
0
22
12
10
56
dyspepsia
epigastric pain
nausea/vomiting
pain rt hypochondrium

CHART OF PATIENT WITH POSITIVE INCIDENTAL GALL BLADDER CARCINOMA & FINAL OUTCOME

Age / Gender	Clinical Presentation	Laboratory Data	Sonography	Operation Open/ Lap Emerge/ Elective	Operative Findings	Pathology	Treatment / Follow-up	Suspicious Operative findings
23/f	Right hypochondrial pain	LFT, Serum amylase, lipase NORMAL	Cholelithiasis	Elective lap cholecystectomy	Gall stones	Poorly differented adenocar-cinoma	Started chemotherapy/ died in 25 days	Thickened GB adherent to liver
37/f	Right hypochondrial pain	LFT,SERUM Amylase, lipase NORMAL	GB Polyp 1.8cm	Elective lap cholecystectomy	polyp	Moderately differentiated adenoca-rcinoma	observation/ alive	nil

DISCUSSION

Discussion

Gallbladder Carcinoma (GBC) is the most common malignancy of the biliary tract and the sixth most common malignancy of the gastrointestinal tract worldwide.

It is an aggressive and a late symptomatic disease and most of the patients are treated at advanced stages.

The prognosis is usually dismal and the 5 year survival rates have been reported to be less than 5% for the more advanced stages. The countries with a high incidence of gallbladder cancer include Chile, Poland, India and Japan.

A very high incidence of this cancer has been reported among women in northern India (21.5/100,000) and among female Native American Indians (14.5/1000,000).

The early-stage carcinoma is typically diagnosed incidentally be-cause of the inflammatory symptoms which are related to the coexistent cholelithiasis or cholecystitis.

Incidental Gallbladder Carcinoma (IGBC) is the carcinoma of the gallbladder which is suspected for the first time during cholecystectomy or which is found on the histological examination of the gallbladder.

With the increasingly widespread acceptance of LC and the difficulties in diagnosing GBC preoperatively, the number of cases of IGBC during and after LCs has increased. The female gender and advanced age are the demographic risk factors for GBC.

The present study which was based in New Delhi, India showed an incidence of 0.96% of IGBC among LC cases over a five and a half year period.

GBC either remains asymptomatic for a long time or it presents with very non-specific symptoms like pain in the abdomen, vomiting, anorexia, jaundice, a gallbladder mass and fever.

The association of GBC with cholelithiasis and chronic gallbladder inflammation is well known. The causes of the gallbladder mucosal inflammation include infection, drugs (such as isoniazid and methyldopa), congenital anomalies (such as choledochal cysts and the

anomalous junction of the pancreaticobiliary ducts) and primary sclerosing cholangitis.

It has been presumed that a longstanding chronic inflammation which is caused by cholelithiasis plays a role in the tumour progression and that carcinogenesis and gallstones of GBC.

However, while most of the patients of GBC will have a history of cholelithiasis, only 0.3-3% of the patients with gallstones develop GBC. The other risk factors include a porcelain(calcified) gallbladder, a typhoid carrier state and gallbladder polyps.

Nakajima et al., reported a 45% risk of cancer for the polyps which measured greater than 15mm. A more recent study in which gallbladder adenomas were analyzed in 91 patients, suggested a classification which was based upon the immunophenotype which was expressed, i.e. pyloric, intestinal, foveolar, and biliary and it indicated that these lesions played a minor role in the pathway of the gallbladder carcinogenesis.

The ultrasonographic findings in early stage GBCs are subtle, with considerable overlaps with the findings of acute and chronic cholecystitis. The features such as a thickened gallbladder wall,

gallbladder or CBD stones, a gallbladder mass and a pericholecystic collection are not characteristic of GBC and they can be associated with cholecystitis.

A pseudotumoural inflammatory condition of the gallbladder, xanthogranulomatous cholecystitis, is also known to radiologically simulate GBC. A pericholecystic collection was noted in one case of acute cholecystitis.

A difficult gallbladder at surgery usually raises the suspicion of cancer. Unusual findings at surgery such as a gallbladder mass, dense adhesions of the organs which are adjacent to the gallbladder and a difficult dissection of the gallbladder from the liver-bed are all pointers to the presence of a possible malignancy.

A severe, destructive inflammation with adhesions is also an important feature of xanthogranulomatous cholecystitis and some series have also reported a simultaneous xanthogranulomatous cholecystitis and a GBC in a small proportion of the cases.

Gallbladder carcinomas are epithelial in origin and they account for 98% of all the gallbladder malignancies. Among these, adeno-carcinomas account for 90% of all the carcinomas of the gallbladder.

A majority (68%) are diffusely infiltrating, while the remainder exhibit intraluminal polypoid growth .

The submucosal spread of the infiltrating carcinomas appears grossly as focal or diffuse areas of wall thickening, nodularity or induration in the gallbladder wall.

Because the flat infiltrating GBCs and the GBCs with cholecystitis and numerous stones are difficult to diagnose preoperatively, Yokomuro et al recommended taking frozen sections in that subset of patients who were of advanced ages (older than 70 years), who had a long history of stones, or those who had a thickened gallbladder wall.

However, Zhang et al., in their study, showed that frozen section was not a definitive diagnostic procedure and that it does not reliably measure the depth of invasion of the GBCs.

The authors recommended that the entire gallbladder be submitted for a microscopic examination and that at least 3 levels be obtained from each paraffin block which demonstrated a carcinoma, so as to be certain that the muscularis propria was not invaded.

On the other hand, a re-exploration with a liver resection and a porta-hepatis lymph node dissection is a radical procedure which is carried out after further imaging, to rule out disseminated disease, which has proven to be beneficial in T2 and T3 gallbladder carcinomas which were first noted after laparoscopic cholecystectomies.

CONCLUSION

CONCLUSION

- incidence of Incidental GBC found in my study is 2%.

- Incidental GBC is becoming more common due to the wide spread use of LC procedures being carried out for benign GB disease

- However, this may be decreasing due to use of ultrasound scanning for upper abdominal symptoms suggestive of GB disease

- Open or L C is adequate treatment for pTis and pT1

- Given the high rate of residual disease , therefore re-resection still the only curative treatment ,and should be strongly considered for pT2 and pT3, but no CBD resection

- Although the type of hepatic resection does not appear to affect the outcome, it is essential to achieve tumour-free surgical margins.

- The prognosis is usually dismal and the 5 year survival rates have been reported to be less than 5% for the more advanced stages.

BIBLIOGRAPHY

BIBLIOGRAPHY

1 Murshid KR. Asymptomatic gallstones: Should we operate? Saudi J Gastroenterol 2007; 13: 57-69.

2. Jemal A, Siegel R, Ward E, Murray T, Smigal C, Thun MJ. Cancer statistics, 2006. CA Cancer J Clin 2006; 56:106–130.

3. Muratore A, Polastri R, Caussotti L. Radical surgery for gallbladder cancer: current options. Eur J Sur Oncol 2000; 5: 438-43.

4. Oddsdottir M, Hunter JG. Gall bladder and the extrahepatic billiary sytem. In: Brunicardi FC, Andersen DK, Billiar TR, Dunn DL, Hunter JG, Pollock RE, editors. Schwartz's principle of surgery (8th ed.). New York: McGraw Hill; 2005.1187-1219.

5. Whang EE, Zinner MJ. Cancer of the Gall bladder and the bile ducts. In: Zinner MJ, Ashley SW, editors. Maingot's abdominal operations (11th ed.). New York: McGraw Hill; 2007. 921-35.

6. Have PC, Simpson KJ, Garden OG. Liver and biliary tract disease. Hasle; C, Chilvers ER, Boon NA, Colldge NR (19th ed.). Churchill Livingstone. 831-88.

7. James MC. Liver and biliary tract. In: Kumar V, Abul KA, Nelson F, editors. Robins and Cotran Pathologic basis of Disease (7th ed.). Philadelphia: Elsevier; 2004. 935.

8. Russel RCG. The gall bladder and bile ducts. In: Russel R.C.G, Williams N.S, Bulstrode C.J.K, editors. Bailey and Love,s short practice of Surgery (24th ed.).London: Hodder Arnold Publication; 2004.1095-1113.

9. Mittal R, Jesudason MR, Nayak S. Selective histopathology in cholecystectomy for gallstone disease. Indian J Gastroenterol 2010; 29: 26-30.

10. Darmas B, Mahmud S, Abbas S, Baker AL. Is there any justification for the routine histological examination of straightforward cholecystectomy specimens? Ann Roy Coll Surg Engl 2007; 89: 238-41.

11. Bazoua G, Hamza N, Lazim T. Do we need histology for a normal-looking gallbladder? Surgeon 2003; 1: 233-5.

12. Eric CH, Lau WY. Gallbladder cancer, a comprehensive review. The Surgeon 2008; 10-19.

13. Misra MC, Guleria S. Management of cancer gallbladder found as a surprise on a resected gallbladder specimen. J Surg Oncol 2006;93:690-8.

14. Contini S, Dalla Valle R, Zinicola R. Unexpected gallbladder cancer after laparoscopic cholecystectomy. Surg Endosc 1999;13:264–7.

15. Amanullah MK, Rizwn AK, Shahid S, Veena M. Occult carcinoma of gallbladder: Incidence and role of simple cholecystectomy. JK- Practitioner 2007; 14: 22-3.

16. Sherestha R, Tiwari M, Ranabhat SK, Aryal G, Rauniyar SK, Shrestha HG. Incidental gallbladder carcinoma: value of routine histological examination of cholecystectomy specimens. Nepal Med Coll J 2010; 12(2): 90-4.

17. Zhang WJ, Xu GF, Zou XP et al. Incidental Gallbladder Carcinoma Diagnosed During or After Laparoscopic Cholecystectomy. World J Surg 2009; 33:2651–6.

18. Naqvi SQH, Mangi IH, Dahri FJ, Khaskheli QA, Akhund AA. Frequency of carcinoma of gall bladder in patients with cholelithiasis. Gomal Journal of Medical Sciences 2005; 3(2): 41-3.

19. Daphna W, Mehrdad H, Noa BJ, Sandbanand AH. Incidental finding of gallbladder carcinoma. Israel Med Assoc J 2002; 4: 334-6.

20. Khoo JJ, Nurul AM. A clinicopathological study of nine cases of gallbladder carcinoma in 1122 cholecystectomies in Johor, Malaysia. Malaysian J Pathol 2008; 30(1):21 – 6.

21. Royal College of Pathologists. Histopathology and cytopathology of limited or no clinical value. Report of working group of The Royal College of Pathologists, 2nd edition London: Royal College of Pathologists, 2005.

ANNEXURES

PROFORMA

INCIDENCE OF INCIDENTAL GALL BLADDER CARCINOMA IN SIMPLE CHOLECYSTECTOMY SPECIMEN BY HISTOPATHOLOGY,MANAGEMENT AND FOLLOW-UP

INVESTIGATOR: DR.PREMKUMAR.E PGY2 MS GEN SUR
GUIDE: PROF.DR.BALAMURUGAN CHIEF S6 UNIT

NAME: AGE/ SEX: IP NO:

ADDRESS:

CONTACT NO:

D.O.A: D.O.S: D.O.D:

CHIEF COMPLAINTS AND RELEVANT HISTORY:

VITAL SIGNS:

SYSTEMIC EXAMINATIONS:

CVS:

RS:

P/A:

INVESTIGATION:

HB -

PCV-

TC –

DC –

ESR –

RBS –

BLOOD UREA –

SERUM CREATININE –

SERUM ELECTOLYTES –

LIVER FUNCTION TEST-

X-RAY CHEST

X-RAY ABDOMEN –

ECG –

USG ABDOMEN

INTRA-OPERATIVE FINDINGS:

HISTOPATHOLOGY REPORT:

POST OPERATIVE MANAGEMENT:

FOLLOW-UP:

INSTITUTIONAL ETHICAL COMMITTEE, STANLEY MEDICAL COLLEGE, CHENNAI-1

Title of the Work : Incidence of incidental GALL BLADDER CARCINOMA in simple Cholecystectomy Specimen by Histopathology, Management and Follow-Up

Principal Investigator : Dr. Prem Kumar .E

Designation : PG in MS (GS)

Department : Department of General Surgery
Government Stanley Medical College,
Chennai-01

The request for an approval from the Institutional Ethical Committee (IEC) was considered on the IEC meeting held on 11.02.2014 at the Council Hall, Stanley Medical College, Chennai-1 at 2PM

The members of the Committee, the secretary and the Chairman are pleased to approve the proposed work mentioned above, submitted by the principal investigator.

The Principal investigator and their team are directed to adhere to the guidelines given below:

1. You should inform the IEC in case of changes in study procedure, site investigator investigation or guide or any other changes.
2. You should not deviate from the area of the work for which you applied for ethical clearance.
3. You should inform the IEC immediately, in case of any adverse events or serious adverse reaction.
4. You should abide to the rules and regulation of the institution(s).
5. You should complete the work within the specified period and if any extension of time is required, you should apply for permission again and do the work.
6. You should submit the summary of the work to the ethical committee on completion of the work.

MEMBER SECRETARY,
IEC, SMC, CHENNAI

DEPARTMENT OF PHARMACOLOGY
CHENNAI-1.
STANLEY MEDICAL COLLEGE

MASTER CHART

Name	Age / Sex	IP No.	Ultra Sound Finding	Surgery	Histopathology	Pathological Type & Stage	Redo-surgery	Follow-up	Clinical Symptoms
sulliamal	70/f	1404999	cholelithiasis	lap cholecystectomy	acute on chronic cholecystitis				pain rt hypochondrium
mani	48/m	1406443	CCC	open cholecystectomy	acute on chronic cholecystitis				pain rt hypochondrium
nagarajan	51/f	1404427	cholelithiasis	lap cholecystectomy	chronic calculous cholecystis				nausea/vomiting
suganya	20/f	1406196	cholecystitis	lap cholecystectomy	chronic cholecystis				epigastric pain
annapoorani	55/f	8393	cholilitiasis	lap cholecystectomy	acute calculous cholecystitis				pain rt hypochondrium
jayalakshmi	30/f	1406548	cholilitiasis	lap cholecystectomy	acute calculous cholecystitis				pain rt hypochondrium
indira	30/f	67913	cholecystitis	lap cholecystectomy	acute cholecystitis				nausea/vomiting
samundeeswari	32/f	7492	cholecystitis	lap cholecystectomy	chrinic cholecystitis				pain rt hypochondrium
jainu	23/f	70919	cholecystitis	lap cholecystectomy	chronic cholecystitis				pain rt hypochondrium
prema	40/f	1407298	cholecystitis	open cholecystectomy	chronic calculous cholecystis				epigastric pain
rajeshwari	52/f	528794	cholecystitis	open cholecystectomy	chronic cholecystitis				pain rt hypochondrium
kasi	58/m	10677	cholecystitis	open cholecystectomy	chronic cholecystitis				nausea/vomiting
mani	58/m	1404222	cholecystitis	open cholecystectomy	acute cholecystitis				dyspepsia
rajaram	48/m	11240	cholecystitis	lap cholecystectomy	chronic cholecystitis				pain rt hypochondrium
parvathi	57/f	1409256	cholecystitis	open cholecystectomy	chronic cholecystitis				nausea/vomiting
navaneethan	42/f	11061	cholelithiasis	lap cholecystectomy	acute calculous cholecystitis				epigastric pain
santhi	68/f	14142	cholecystitis	open cholecystectomy	chronic cholecystitis				pain rt hypochondrium
kongunathan	48/m	12777	cholecystitis	open cholecystectomy	acute cholecystitis				epigastric pain
salsa	26/f	15260	cholecystitis	lap cholecystectomy	acute cholecystitis				pain rt hypochondrium
murugesan	70/m	1416390	cholecystitis	lap cholecystectomy	acute cholecystitis				dyspepsia
thangaraj	55/m	12972	cholecystitis	open cholecystectomy	chronic cholecystitis				pain rt hypochondrium
arasu	37/f	20723	GB polyp	lap cholecystectomy	ADENOCARCINOMA GB pt2	MODERATELY DIFFERENTIATED	completion radical	alive/no symptoms/ CT normal/duration 6m	pain rt hypochondrium
yasodha	50/f	11286	cholelithiasis	open cholecystectomy	CHC				dyspepsia
meenamegalai	60/f	11262	cholecystitis	lap cholecystectomy	chronic cholecystitis				pain rt hypochondrium
perumal	75/m	17047	cholecystitis	lap cholecystectomy	chronic cholecystitis				dyspepsia
vijayalakshmi	66/f	18186	cholecystitis	lap cholecystectomy	acute cholecystitis				pain rt hypochondrium
dhanalakshmi	30/f	17243	cholelithiasis	open cholecystectomy	acute calculous cholecystitis				dyspepsia
devi	32/f	16782	cholecystitis	lap cholecystectomy	acute cholecystitis				pain rt hypochondrium
nithya	43/f	19857	cholelithiasis	lap cholecystectomy	acute calculous cholecystitis				epigastric pain

Name	Age / Sex	IP No.	Ultra Sound Finding	Surgery	Histopathology	Pathological Type & Stage	Redo-surgery	Follow-up	Clinical Symptoms
meera	30/f	19421	cholelithiasis	lap cholecystectomy	chronic calculous cholecystis				epigastric pain
muniammal	50/f	19233	cholecystitis	lap cholecystectomy	chronic cholecystitis				pain rt hypochondrium
sumathy	29/f	20152	cholelithiasis	lap cholecystectomy	CCC				dyspepsia
rubavanan	23/f	18837	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
kumuthavalli	60/f	17713	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
selvathi	26/f	1979	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
manimegalai	35/f	20572	cholecystitis	open cholecystectomy	CHC				dyspepsia
nayaer	33/m	18150	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
priya	18/f	18061	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
deivamani	42/f	19396	cholelithiasis	lap cholecystectomy	CCC				pain rt hypochondrium
anjalai	30/f	21851	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
elavarasi	28/f	21513	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
kumar	53/m	21034	cholecystitis	lap cholecystectomy	CHC				dyspepsia
durai	55/m	21716	cholecystitis	lap cholecystectomy	CHC				dyspepsia
anandharani	58/f	24481	cholecystitis	open cholecystectomy	CHC				pain rt hypochondrium
sathya	30/f	21783	cholecystitis	open cholecystectomy	CHC				pain rt hypochondrium
binu	32/f	1425863	cholecystitis	lap cholecystectomy	CHC				nausea/vomiting
nallasamy	84/m	23576	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
suganthi	45/f	24040	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
uma	45/f	24471	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
fridonsa	39/f	25021	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
godhandaraman	68/m	22204	cholelithiasis	open cholecystectomy	CHC				pain rt hypochondrium
godhandan	48/m	22704	cholecystitis	lap cholecystectomy	CHC				nausea/vomiting
govidhammal	55/f	23519	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
mala	36/f	24928	cholecystitis	lap cholecystectomy	CHC				dyspepsia
kathayee	70/f	199668	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
rajendran	62/m	23550	cholelithiasis	lap cholecystectomy	CCC				dyspepsia
vijaya	45/f	25892	cholelithiasis	lap cholecystectomy	CCC				pain rt hypochondrium
gunasekar	60/m	27975	cholelithiasis	lap cholecystectomy	CCC				dyspepsia
angammal	32/f	28006	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
suganthi	23/f	1428147	cholelithiasis	lap cholecystectomy	GB ADENOCARCINOMA pt3	POORLY DIFFERENTIATED CA		dead/1m	pain rt hypochondrium
vijaya	45/f	25202	cholecystitis	lap cholecystectomy	CHC				epigastric pain
mohana	55/f	29082	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
pushpalatha	50/f	26692	cholelithiasis	open cholecystectomy	CCC				dyspepsia
ambujam	57/f	28252	cholelithiasis	lap cholecystectomy	CCC				pain rt hypochondrium
sundari	25/f	27107	cholecystitis	lap cholecystectomy	CHC				dyspepsia
mary joice	44/f	1925175	cholelithiasis	lap cholecystectomy	CCC				pain rt hypochondrium
boopathi	22/f	29149	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
abisha bee	40/f	30270	cholecystitis	lap cholecystectomy	CHC				epigastric pain
saritha	22/f	29889	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
amutha	42/f	27336	cholecystitis	lap cholecystectomy	CHC				epigastric pain
meena	55/f	29809	cholecystitis	lap cholecystectomy	CHC				nausea/vomiting
abirami	28/f	31052	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium

Name	Age / Sex	IP No.	Ultra Sound Finding	Surgery	Histopathology	Pathological Type & Stage	Redo-surgery	Follow-up	Clinical Symptoms
sujatha	35/f	33047	cholecystitis	lap cholecystectomy	CCC				pain rt hypochondrium
sarojini	46/f	36011	cholecystitis	lap cholecystectomy	CHC				epigastric pain
vetrivel	42/m	36072	cholecystitis	open cholecystectomy	CHC				nausea/vomiting
dhanalakshmi	30/f	1437454	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
moorthy	52/m	1439852	cholecystitis	lap cholecystectomy	CHC				dyspepsia
valli	28/f	39094	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
lakshmi	40/f	36683	cholecystitis	lap cholecystectomy	adenomatous hyperplastic GB				pain rt hypochondrium
harikrishnan	47/m	1435504	cholecystitis	lap cholecystectomy	CHC				nausea/vomiting
moorthy	62/m	1440645	cholecystitis	open cholecystectomy	CHC				pain rt hypochondrium
thilagavathy	62/f	1990308	cholecystitis	lap cholecystectomy	CHC				dyspepsia
rani	45/f	1440242	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
kamaraj	50/m	143854	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
devi	32/f	1442565	cholecystitis	lap cholecystectomy	CHC				epigastric pain
ramalamma	40/f	1442853	cholelithiasis	lap cholecystectomy	CCC				pain rt hypochondrium
mahalakshmi	55/f	1442380	cholecystitis	lap cholecystectomy	CHC				dyspepsia
lakshmi	42/f	1444284	cholecystitis	open cholecystectomy	CHC				pain rt hypochondrium
chitra devi	21/f	1442682	cholelithiasis	lap cholecystectomy	CCC				pain rt hypochondrium
devaki	60/f	1441090	cholelithiasis	lap cholecystectomy	CCC				pain rt hypochondrium
purushothman	30/m	1442984	cholecystitis	lap cholecystectomy	CHC				dyspepsia
punitha	28/f	1444237	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
adilakshmi	28/f	1446307	cholecystitis	lap cholecystectomy	CHC				nausea/vomiting
shanavaz banu	34/f	1445505	cholecystitis	lap cholecystectomy	CHC				epigastric pain
tamilarasi	28/f	1445732	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
shanmugasundaram	38/f	1447419	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
padma	40/f	1404417	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
sulliamal	70/f	1404999	cholecystitis	lap cholecystectomy	CHC				pain rt hypochondrium
shantha	40/f	143278	cholelithiasis	open cholecystectomy	CCC				pain rt hypochondrium
faridha	45/f	148605	cholelithiasis	open cholecystectomy	CCC				pain rt hypochondrium

CHC - CHRONIC CHOLECYSTITIS

CCC- CHRONIC CALCULOUS CHOLECYSTITIS

GB- GALL BLADDER

P- PATHOLOGY

T- TUMOUR SIZE

N- NODE

M-METASTASIS

பித்தப்பை கற்களினால் அவதியுறும் நோயாளிகளில், பித்தப்பை அறுவை சிகிச்சைக்குபின், திசு பரிசோதனை மூலம் பித்தப்பை புற்றுநோய் எண்ணிக்கை கண்டறிதல்

ஆய்வாளர் : டாக்டர். ஏ.பிரேம்குமார்
முதுநிலை பட்ட மேற்படிப்பு மாணவர்
அறுவை சிகிச்சை பட்டபடிப்பு

வழிகாட்டி : **பேராசிரியர். டாக்டர். பாலமுருகன்**
அறுவை சிகிச்சை பேராசிரியர்
அரசு ஸ்டான்லி மருத்துவமனை

பங்கேற்பாளரின் தகவல் படிவம்

நீங்கள் இந்த ஆய்வில் பங்கேற்க அழைக்கப்படுகிறீர்கள் இந்த ஆய்வில் பங்கேற்கும் முன்னர், இதன் நோக்கத்தையும், முறைகளையும் இதனால் ஏற்படக்கூடிய பின்விளைவுகள் ஏதேனையும் நீங்கள் அறிந்துக் கொள்ள ஆய்வாளர் அளிக்கும் தகவல் பின்வருமாறு :

பித்தப்பையில் கற்களினால் அவதியுறும் நோயாளிகள் இந்த ஆய்வில் சேர்த்துக் கொள்ளப்படுவார்கள். உங்கள் நோயின் வரலாறும், உங்களின் முழு உடல் பரிசோதனையும் தெளிவாகவும் விரிவாகவும் பதிவு செய்யப்படும். உங்கள் நோயை கண்டுபிடிக்க தேவையான மருத்துவப் பரிசோதனைகளும் செய்யப்படும்.

இதன் மூலம் பித்தப்பை கற்கல் உள்ளவர்கள் ஆய்வில் பதிவு செய்யப்படுபர். அதன் பின் அறுவை சிகிச்சை செய்யப்படும். அறுவை சிகிச்சைப்பின் நோயாளிகளின் பித்தபையின் திசு பரிசோதனை மேற்கொள்ளப்படும் அதன் பின் நோயாளிகள் கண்காணிப்புக்கு அழைக்கப்படுவீர்கள்.

இந்த ஆய்வில் முடிவுகள் மருத்துவக் காரணங்களுக்காகவும் மருத்துவக் கல்விக்காகவும் பயன்படுத்தப்படும். இந்த ஆய்வு பற்றிய சந்தேகங்களுக்கு உரிய முறையில் விளக்கமளிக்கப்படும். தங்களைப் பற்றிய தகவல்கள் ரகசியமாகப் பாதுகாக்கப்படும்.

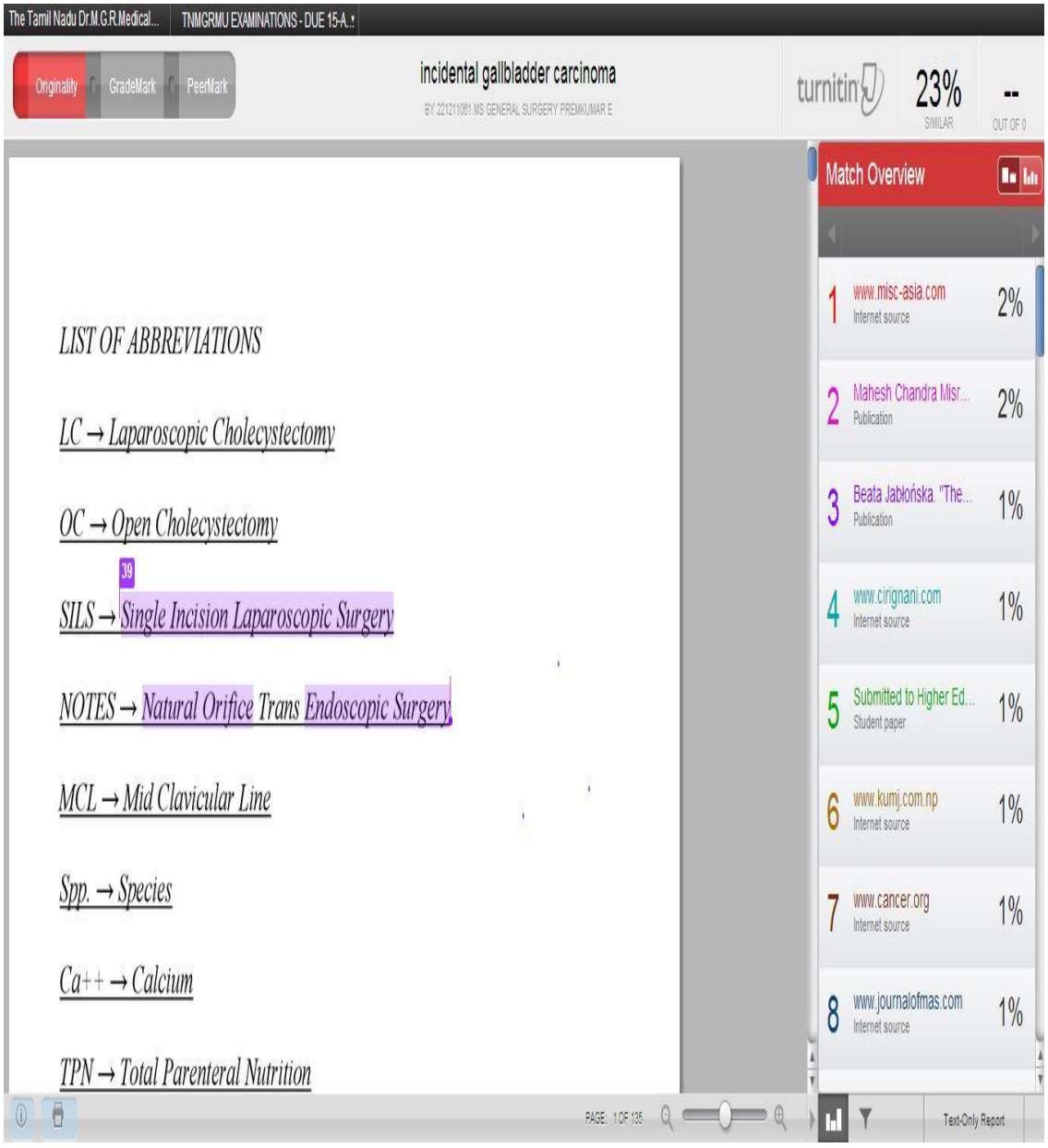
இந்த ஆய்விலிருந்து எப்பொழுது வேண்டுமானாலும் தாங்கள், எவ்வித முன்னறிவிப்பின்றியும், எவ்வித சட்டக் சிக்கலும் இன்றியும், விலகிக்கொள்ளலாம்.

இந்த ஆய்வில் பங்கேற்குமாறு கேட்டுக் கொள்கிறேன்.

நன்றி,

ஆய்வாளர் கையொப்பம்
(டாக்டர். ஏ.பிரேம்குமார்)

நோயாளியின் கையொப்பம்
பெயர் :


The Tamil Nadu Dr.M.G.R.Medical...
TNMGRMU EXAMINATIONS - DUE 15-A...
Originality
GradeMark
PeerMark
incidental gallbladder carcinoma
BY 221210061.MS GENERAL SURGERY PREMKUMAR E
turnitin
23%
SIMILAR
--
OUT OF 0
LIST OF ABBREVIATIONS
LC → Laparoscopic Cholecystectomy
OC → Open Cholecystectomy
SILS → Single Incision Laparoscopic Surgery
NOTES → Natural Orifice Trans Endoscopic Surgery
MCL → Mid Clavicular Line
Spp. → Species
Ca++ → Calcium
TPN → Total Parenteral Nutrition
Match Overview
1 www.misc-asia.com Internet source 2%
2 Mahesh Chandra Misr... Publication 2%
3 Beata Jabłońska. "The... Publication 1%
4 www.cirignani.com Internet source 1%
5 Submitted to Higher Ed... Student paper 1%
6 www.kumj.com.np Internet source 1%
7 www.cancer.org Internet source 1%
8 www.journalofmas.com Internet source 1%
PAGE: 1 OF 135
Text-Only Report